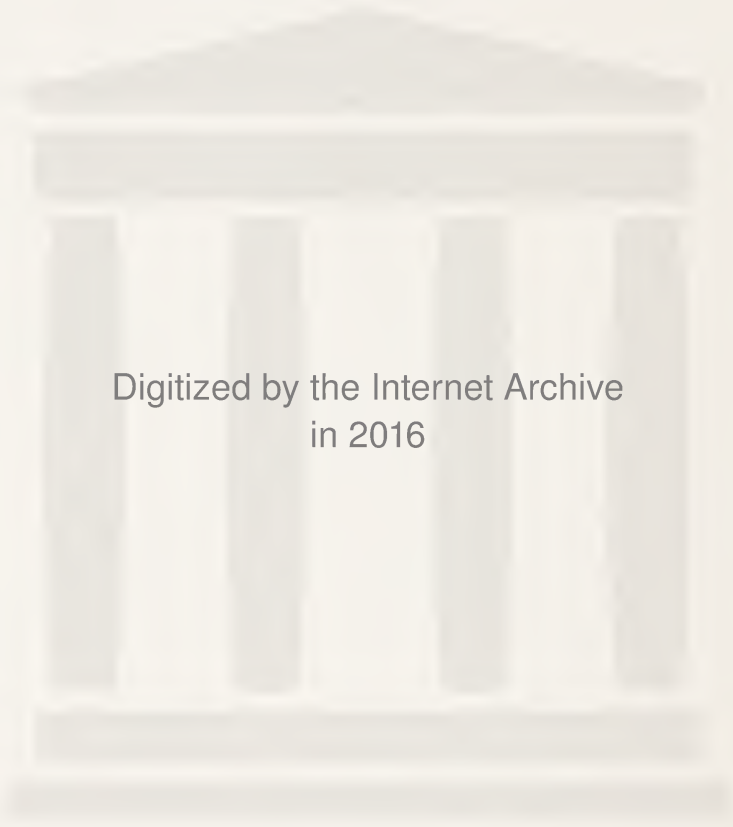


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THE PRINCIPLES OF PLANNING

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THE
PRINCIPLES OF PLANNING

AN ANALYTICAL TREATISE

FOR THE USE OF ARCHITECTS AND OTHERS

BY

PERCY L. MARKS, Architect

ILLUSTRATED BY

ONE HUNDRED AND FIFTY PLANS OF VARIOUS TYPES
OF BUILDINGS

Chiefly of Executed Works by Eminent Modern Architects

SECOND EDITION, REVISED AND ENLARGED
WITH MANY ADDITIONAL EXAMPLES.

LONDON

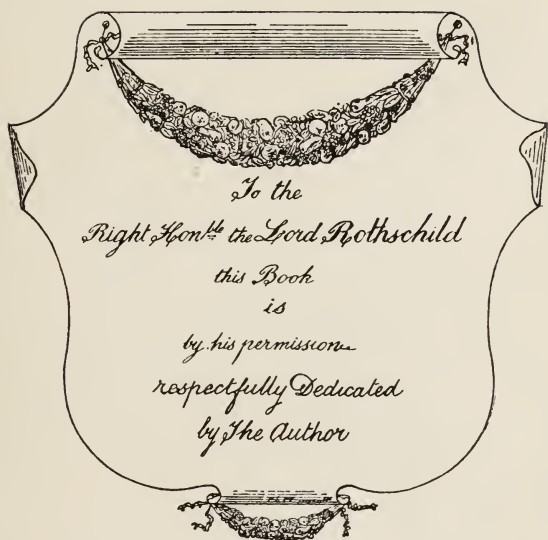
B. T. BATSFORD, 94 HIGH HOLBORN

1905

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To the
Right Hon^{ble} the Lord Rothschild
this Book
is
by his permission
respectfully Dedicated
by The Author

PREFACE TO THE SECOND EDITION.

IN the preface to the first edition of this book, the author had occasion to record the kind co-operation he met with from those to whom he applied for the use of plans in illustration, which kindness has been continued in the preparation of this edition, plans having been freely lent for the purpose. Mr Stanley Peach has kindly lent, for direct reproduction, the black and white transfers of the Battersea Central Power Station. In every other example the author has personally prepared the drawings, and he has taken the opportunity to add scales to them, many having been left unscaled by him in the first edition.

There has been considerable enlargement as regards both illustrations and text, the latter having also been subjected to close revision, whilst further matter of interest is introduced in the form of appendixes.

The author desires to express his appreciation of the reception accorded to his book, and likewise his hope that the new edition will meet with as cordial a welcome as the first received.

A suggestion was made that the plans should be submitted to analytic examination by the author, but this would be an ungracious act of hypercriticism ; for whilst it may be readily understood that the plans included appeal to him on account

of their general excellence, yet they are but illustrative, being merely good examples, and not professing to be exemplars. It is a peculiarity belonging to architectural conceptions, that a plan but rarely admits of reproduction in its entirety, and many seemingly weak points are merely the outcome of local conditions and cliential requirements, which remove them from the plane of animadvertive criticism.

PERCY L. MARKS.

ALBERT BUILDINGS,
49 QUEEN VICTORIA STREET,
LONDON, *December* 1904.

PREFACE TO THE FIRST EDITION.

THE production of the following chapters has been of the nature of what is aptly termed a labour of love, and is the outcome of the pleasant occupation of many leisure hours.

Whatever value the text may have will be very much enhanced by the illustrations of executed works and of those destined for erection; and the writer's thanks are due for the kindness and consideration he has met with in response to his requests for permission to reproduce plans of specific buildings. For the mere permission thanks are due and are heartily recorded; but when this is accompanied by evidences of labour specially undertaken for the purpose and by the offer to give every facility and supply any desired information, then the obligation conferred is largely augmented; this additional obligation the recipient would not wish to be lessened in the slightest degree; he is satisfied to call attention here to the kindly *esprit de corps* which was doubtless to a large extent a factor.

Attention should be given to the fact that the drawings are all reproduced without scales being given. Various reasons might be offered in explanation, but it suffices to remark that in the majority of instances the plans are meant to be merely illustrative of the accommodation or disposition desirable in

any specific class of building. In various examples, where figured dimensions are of value, they are introduced, and in such cases will serve to give scale to the drawing, but in general it was considered inadvisable to reproduce scales for such small drawings.

PERCY L. MARKS.

ALBERT BUILDINGS,
49 QUEEN VICTORIA STREET,
LONDON, *December* 1900.

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THE PRINCIPLES OF PLANNING.

CHAPTER I.

INTRODUCTORY REMARKS.

OF the varied phases of an architect's life-work there are none requiring greater consideration and more careful treatment than the planning of buildings, and it is hoped that the course pursued in the following chapters will prove acceptable.

The leading idea is to show the *Principles of Planning* in close theoretical and practical association; in this way it may be clearly seen where and to what extent liberties may be taken with first principles. It is too common an error to consider formulæ as the Alpha and Omega, but it is well to bear in mind the hackneyed proverb, "The exception tests the rule." Our Teutonic friends are said to carry this test to the extreme, by their acknowledgment of more exceptions to a rule than instances of it; and though there is probably some exaggeration in the charge, yet are they to be congratulated on their refusal to adhere rigidly to any rule, which in its nature should admit of elasticity.

Of course the very nature of a rule implies that it should be more often followed than broken, but the closer we approach to an equation in regard to instances and exceptions the more credible will the above paradox be. For the present let it be borne in mind that a more pleasing work of art is obtained by the use of light and shade and perspective effects than by the mere outline of any object.

Perspective effects! The term is used advisedly, as the result desired may necessitate some modification of the principles to be dealt with in this book; they must be accorded their relative (not their absolute) value, when worked in conjunction; failing this, buildings frequently prove unsatisfactory on analysis, for if the component parts be faulty, a satisfactory whole will not result.

It is futile to attempt anything without certain guiding principles, but these must not always be too rigidly observed.

In most branches of learning, Theory is apt to prove too severe a teacher and to insist on the restrictions imposed by her somewhat prejudiced ideas; it may in fact be asserted, without fear of undue opposition, that she would make an excellent servant, though often inclined to be a tyrannical mistress.

It has been deemed advisable to state the *Principles* in close succession in the first place, defining their nature merely, so as to obtain an easy grasp of the essentials of practical planning.

It is impossible to deal with all the varying conditions that may arise, and moreover it would be beyond the scope of this book to attempt it. But the *Principles* being explained and at the same time exemplified, it should be an easy matter to deal with most cases arising in the course of an architect's practice; and should there be instances where this book fails to throw adequate light, the talent of the architect should be equal to their solution. It is therefore to be clearly understood that the following pages are not written with the design of forming an easy "crib" for particular cases: were this the central idea, the arrangement of the contents would have assumed a very different form. The information contained within requires careful assimilation to yield the nourishment that might reasonably be expected.

It is a great mistake for any text-book to attempt to be the means of shutting the door on all original thought. Some writer has wisely remarked that "there is no substitute for

thought"; within limitations, this is true. The duty of all who write educational books ends in that connection when they have rough-hewed the steps to Parnassus;* each wayfarer should be armed with the staff of intelligent perseverance as an assistance in the ascent. The personal element in the endeavour to surmount difficulties exerts a beneficent influence and enables those who possess it to attain to those loftier heights, which are the objects of envy to the multitude gazing upwards, though they prove to be the inheritance of only a small and select band.

* The simile is permissible, though prose and not poetry is in question.

CHAPTER II.

ENUNCIATION OF BROAD PRINCIPLES.

THE first point that calls for attention is the GENERAL SCOPE of the building to be planned ; and intimately associated with this should be the attention paid to the REQUIREMENTS IN ACCOMMODATION AND SIZE.

As illustrating the reference to *general scope*, the cases of a hospital and a gaol may well be contrasted ; the former would require a maximum of window surface and an extended ground plan, where the latter would show a maximum of solid wall and a relatively restricted site. This rapid consideration is very desirable, as it frequently serves to give the architect a preliminary glimpse of the scheme as it will be developed later, and therefore has a distinct value of its own.

THE RELATION OF THE SITE TO ADJOINING BUILDINGS should also influence the moulding of the architect's scheme ; and this influence would be felt, whether the position of the proposed building were isolated by standing in the midst of acres of private ground or whether closely hemmed in on a busy thoroughfare. In these illustrations it is evident that there is a great contrast between the assured freedom from the restrictions caused by "Ancient lights" and invasion of privacy in the former case and their probable occurrence in the latter.

Under ordinary circumstances, CORRIDORS *should only be provided as may be necessary* ; the statement is current that increase of corridor (or its equivalent) is coincident with increase of luxury, and though an architect will not find fault with clients' expansive and expensive ideas, yet it is as a rule his duty to secure economy of "service," as this is of great importance for obtaining comfort.

In blocks of Offices and certain other classes of buildings, there is necessarily a large amount of corridor in the aggregate, but the principle does not vary. A note of warning may be sounded to the effect that, in the endeavour to avoid excess of corridor, an architect should refrain from making one room the sole means of communication with any other.

ASPECT should be dealt with on its own merits, but may have to be considered conjointly with the peculiarities of the site, as the contour of the surrounding country may in some instances produce effects requiring treatment differing from what would be desirable by merely noting the points of the compass.

PRIVACY is necessary both for screening the interior of one room from others, and also of all rooms or any room from the entrance doors, corridors, and elsewhere.

ROOMINESS, though not always obtainable, should be striven for; and judgment being used, the avoidance of a cramped effect may result, even where the actual dimensions are small. "Cribbed, cabined, and confined" is too often the concrete issue of an architect's abstract ideas.

FURNITURE REQUIREMENTS, failing consideration, supply a fruitful source of discomfort; and this does not apply to merely one class of buildings, but is of general application.

PROSPECT must be duly considered, though it is not as important as some others of the points above noted: it may however be conceded, that to take advantage of the beauties of nature's landscapes should be considered a law of Art.

GROUPING is another point for consideration. In the strict acceptance of the term, it might be permissible only to discuss the relative position of blocks of rooms or the mutual relation of departments; but the term may well be given an extended significance, which will prove beneficial to the system that is used in this manual.

DESIGN * as regards the elevations must be borne in mind

* The word "design" throughout this book is hereafter used to signify the treatment of the elevations.

whilst working on the scheme of planning, as it will be found to be advantageous to the former and not detrimental to the latter to any considerable extent; if on the contrary the plan is schemed irrespective of the design, it proves in the end injurious to one and perhaps both.

ECONOMY is not an invariable consideration, but in a large majority of cases architects are under the necessity of striving to make one sovereign give the value of two; and though there may be pleasure in working out a scheme untrammelled by any motives of economy, yet there is a keener delight in the successful accomplishment of "cutting the coat according to the cloth"; it is essential that it should be done successfully, otherwise the sensations of both architect and client are the reverse of pleasant.

There are many minor points to be dealt with in the attempts to produce a satisfactory plan, and these are considered later in the book, though it is unnecessary to make separate mention of them at this place.

CHAPTER III.

ESSENTIAL FEATURES, ACCOMMODATION, ETC.

IN the previous chapter it was stated that the *general scope* of a building makes the first demands on the architect's thoughts. This was advocated on sufficiently strong grounds, and it will be now advisable to compress in as short a space as possible the essential features and the requirements in accommodation, etc., of different classes of buildings. When an architect is desired to scheme, say, a theatre, his thoughts would assume some such form as this:—A theatre requires a well-arranged stage, with all the accessories of dressing-rooms, "green-room," gridiron, stores, etc. etc., a sufficient area for the auditorium, adequate entrances and exits (the latter especially), and due heed must be given to optical and acoustic requirements—The above gives at a glance the essentials of a theatre plan. Fire resistance is of course all important, but as it has but very slight influence on the plan, it scarcely merits inclusion in the above summary, and is only mentioned here to account for its exclusion. "Natural" lighting is of secondary consideration in a theatre.

The architect, bearing in mind the essential features, will proceed to schedule the requisite accommodation; if he is furnished with specific instructions, his task is in a manner simplified, though it does not relieve him from the responsibility of revising the list, if necessary or desirable. Obtaining his client's written sanction to such revised schedule is an advisable proceeding.

It would be going beyond the scope of this work to enter into the matter of cost, and it may be better for the immediate purpose to be free from the trammels of restricted outlay, yet

always remembering that under average conditions the best planning is that which provides the greatest possible economy of "service."

The lists that follow can for the most part merely note generalities, and this is more in keeping in a treatise such as the present one, as distinguished from a book dealing with some specific class of buildings.

The essential features and the requisite accommodation may overlap and repeat in places in the following lists, but are generally distinctive. For facility of reference the lists are arranged in alphabetical order, as it has not been deemed possible to pursue any other system successfully. It may be premised that the lists marked (*a*) give essential features, and those marked (*b*) the requisite accommodation.

Abattoir.—(*a*.) Plentiful accommodation for animals in reserve and under treatment, good lighting and ventilation, privacy, ample storage.

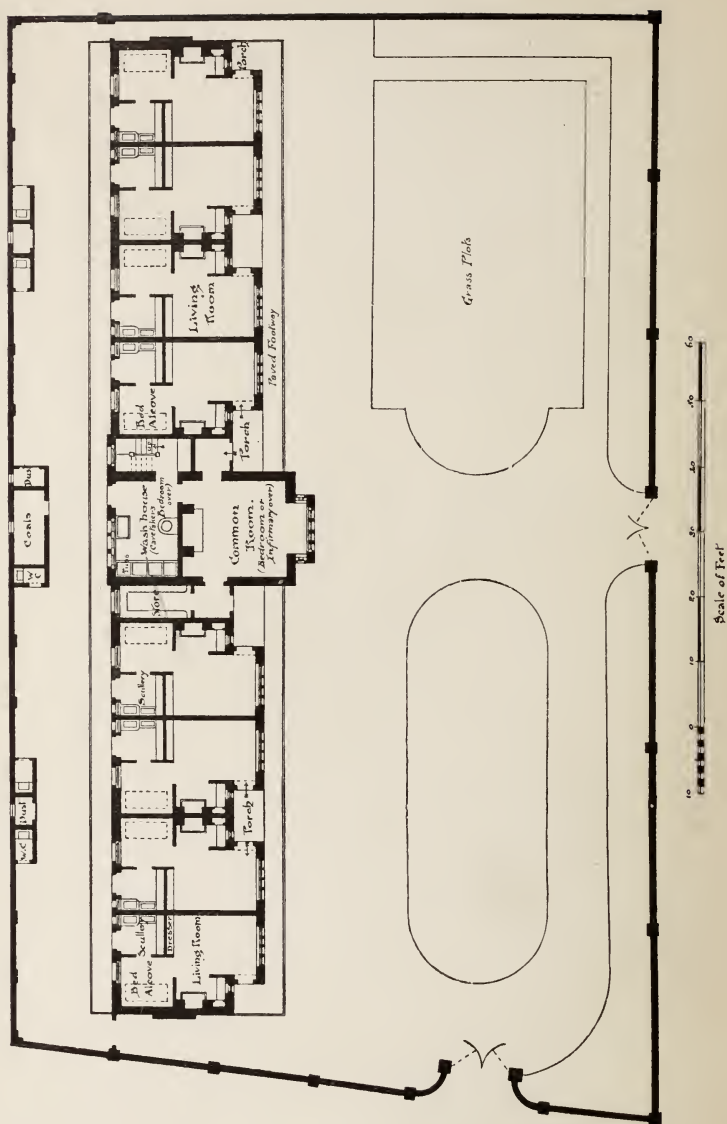
(*b*.) Pens and killing-sheds for various animals; cooling, salting and pickling rooms; cold stores, melting-houses (with coppers), offices, lavatories, etc., roadways, boiler-house, caretaker's rooms, etc.

There is no distinctive unit of accommodation except so far as an approximate calculation may be made in regard to the number of animals that can be simultaneously accommodated. It is to be borne in mind, however, that sheep and pigs should be allowed a floor space of not less than 6 ft. super. per head; calves and oxen to be allowed 8 ft. and 24 ft. respectively on a similar basis.

Each slaughter-house (killing-shed) should be of ample size. Good average dimensions would be 100 ft. by 50 ft. The various processes should be effected so as to prevent living animals seeing them even to the slightest extent.

The coppers are required for boiling down the fat. There should also be a pit for offal, which may either be burnt in a

THE Llewellyn Almshouses, Neath; Glamorganshire.
Architect: George E. Halliday, F.R.I.B.A.



destructor furnace on the premises, or it may be carted away at frequent intervals from the pit for disposal elsewhere.

The salient angles should be in all cases well rounded, so as to minimise the chances of collision and abrasion; the interior angles should be similarly treated for sanitary reasons.

Almshouses.—(a.) Compact accommodation, aspect, lighting, ventilation, prospect.

(b.) Living room, scullery, bedroom accommodation, domestic offices, separate entrance to each dwelling, common room.

The guiding principle is to remember that these retreats for aged respectable people should be made thoroughly homelike and cheerful; and seeing that the inmates are mostly feeble, there should not be more than one storey above the ground floor, nor should there be any basement, not even to the extent of cellarge. Of course, each dwelling should be self-contained, and on one floor only. The common room is not an indispensable, though a desirable feature. The different rooms should be restricted in size, in the interests of each tenant, so as to minimise the trouble of keeping clean and in order.

On Plate I. is given a plan of some Welsh almshouses designed by Mr George Halliday.

Art Galleries.—(a.) Ample accommodation for works of art and for the public, top-lighting in the galleries, symmetrical treatment (under the best conditions), good staircases, thoroughfare treatment of galleries from end to end.

(b.) Galleries for various classified works of art, packing and delivery rooms, committee-room, curator's and clerical offices, cloak and umbrella stores, lavatories, etc., refreshment-room, picture-hoist, stores, caretaker's rooms, etc.

This accommodation would provide for an important exhibition, either permanent or temporary.

As a good example, the plan of the exhibition galleries of the Royal Academy of Arts, London, is given on Fig. 1, the architect being the late Sydney Smirke, who succeeded in producing a very creditable building. It may be noted that

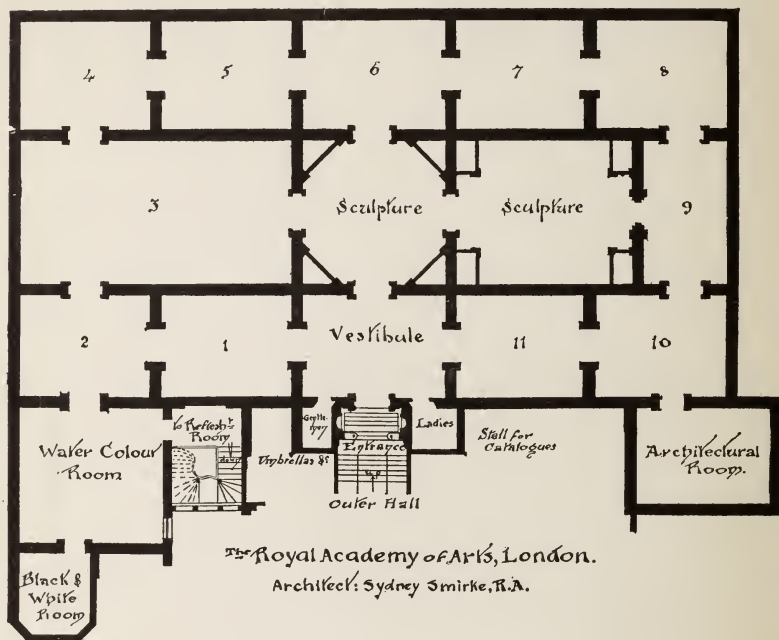


FIG. 1.

for "cabinet" paintings and miniatures a side-lighted gallery is preferable to one that is top-lighted.

Art Schools.—See under "School of Art."

Artisans' Dwellings.—(a.) Economical planning, ample side lighting, great attention to arrangement of sanitary offices; provision of the laundry requirements outside the dwelling, but otherwise each dwelling to be

self-contained ; good ventilation ; provision of suites of varied accommodation ; panic exits.*

(b.) Living room, scullery, bedroom accommodation, W.C., larder, coal-store, laundry.

The basis for consideration should be the amount of accommodation that can be provided so as to allow the buildings to be financially self-supporting ; for though philanthropy may find the means at the commencement, yet these concerns should always be calculated on a sound financial basis. It is very rare to find an instance of endowment, which for present purposes may be disregarded.

Though the question of finance is not supposed to be in evidence in this work, yet for the class of building under consideration it has to be dealt with here. Therefore it is necessary to state, as succinctly as may be possible, that the rent to be placed on a room or dwelling should represent the smallest *feasible* return on the capital outlay, which should be expended in the most economical way, so as to distribute the benefit of the expenditure for a maximum number of people.

If slums are to become permanently historic, it can only be by providing for the smallest wage-earners a decent dwelling at a minimum rental. It would be out of place here to enlarge on the subject of the assistance that has been recently rendered by the Local Government Board lengthening the periods of duration of loans, and also as to permission to municipalities to buy land and erect dwellings beyond their borders ; cheaper rentals would be possible by these means, but these subjects open up a vast field for inquiry as to further possible facilities that might be granted by Parliament itself, and, as can be easily understood, are better left for treatment on platform and in forum.

* In London, the County Council requires that in any new buildings with storeys more than 60 ft. above the street level, adequate means of escape shall be provided for those employed or dwelling therein. See London Building Act, 1894, Sect. 63.

The expenditure on artisans' dwellings usually comprises the purchase money for the land (and interest also if it is a loan), the cost of construction of the buildings, and their maintenance, together with taxes, rates, and insurance, and a commission also on the rent collection. If the interest in the property is only leasehold, the above expenses will be varied by the payment of ground rent, and by an annual reserve for redemption of capital. Also a sinking fund for depreciation is sound finance. It can be readily understood that whilst good sanitary construction is of prior consideration, economy should be always carefully studied.

Plenty of air and light should be provided; it used to be of common occurrence for small houses to be built back to back, but this is now generally condemned. The architect's powers end with the provision of healthily-schemed buildings; it must rest with the owner, the landlord, or (in the last instance) the local authority, to prevent them from becoming slum dwellings.

The water-closet and the dust-shoot should be kept well away from the living and bed rooms. The roof may be advantageously an asphalted flat for utilisation as a playground, with a portion enclosed for laundry purposes.

Every care should be exercised to avoid chance collections of dust and disease germs.

From personal acquaintance with a large number of the dwellings of the poor, it may be noted that there is, in a majority of cases, great indifference to cleanliness on the part of the tenants. This being so, the architect should strive to minimise the chances of accumulations of dust and other objectionable matter, and this can be effected in different ways :—(1) Corners may be rounded, and (2) the angles made by junction of walls with floors and ceilings may be similarly treated. (3) Hollow spaces behind skirtings, etc., should be avoided, and (4) light should penetrate to every portion of the room. Add to the above (5) the use of non-absorbent materials which are at once washable and without detrimental effects from this action, and the chance of retention of any foul matter is reduced to a minimum as far as lies in the architect's power.

If rounded corners are desirable for angles of rooms as above stated, they are of equal value for passage angles, so as to obviate many an unpleasant collision.

The plan given on Fig. 2 is a portion of one of the blocks designed for the London County Council's Millbank Estate by Messrs Spalding & Cross. The minimum size for a living room may be taken at 120 ft. super., and one bedroom should be not less than about 130 ft. super. and a second 90 ft. to 100 ft. superficial.*

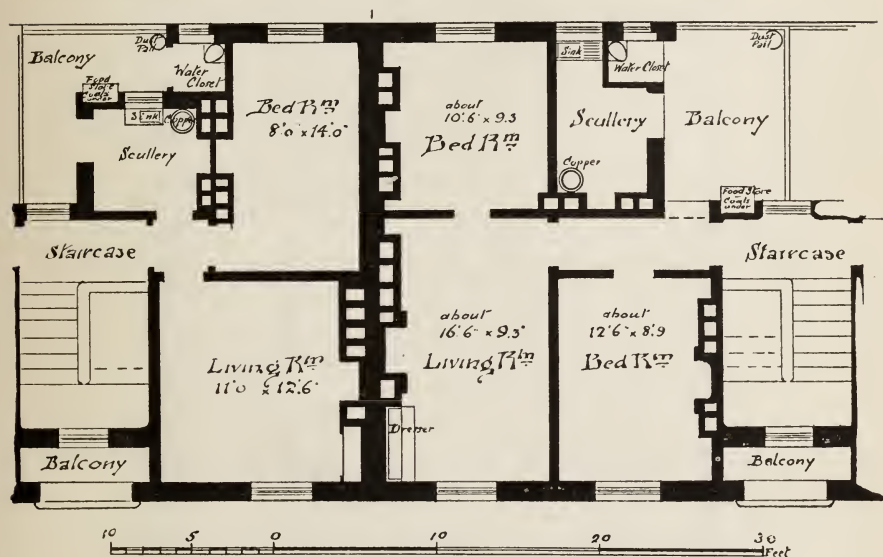


FIG. 2.—PLAN OF PORTION OF ARTISANS' DWELLINGS, MILLBANK.

Municipal and similar lodging-houses (which are intended more especially for the use of the artisan class than for any other) require accommodation in dormitories with cubicles, washing-rooms, dining-room, lodgers' kitchen, smoking-room, reading-room, latrines, workrooms, lockers, administrative kitchen and laundry with their offices, rooms for staff, etc.

* In the dwellings provided at Tottenham by the London County Council, the minimum size for a bedroom is 96 ft. superficial; the provincial authorities are frequently less liberal, 85 ft. superficial or less as the minimum size being in evidence.

Assize Courts.—(a.) Accommodation in the Court for the representatives of the Law, the parties concerned, the Press and the public; good corridor communication, acoustic requirements, grouping, dignified and spacious planning, and (where Criminal Courts are in question) private communication between the day-cells and the dock.

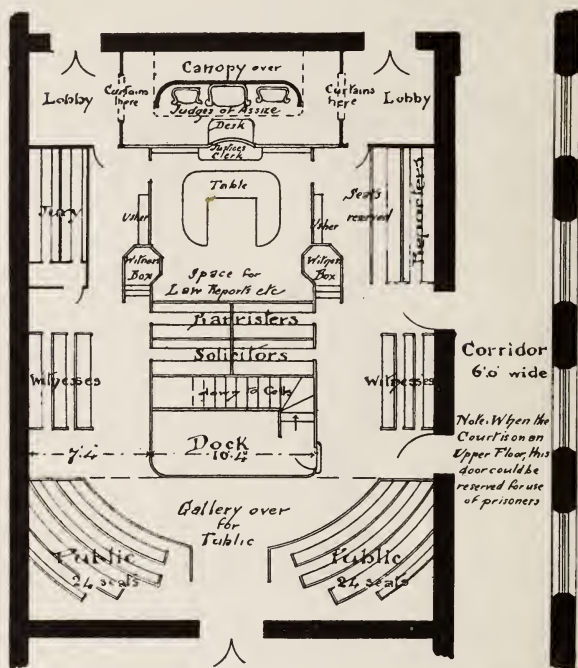


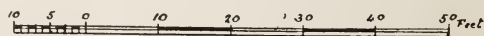
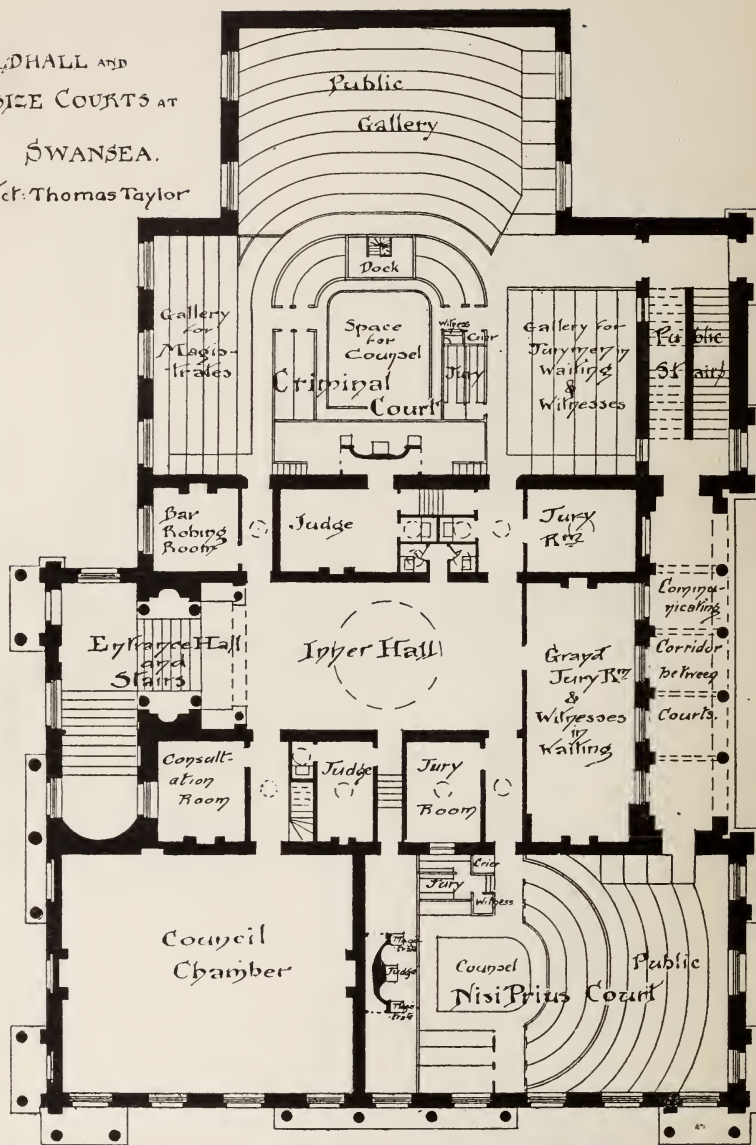
FIG. 3.—PLAN OF ASSIZE COURT (TOP-LIGHTED).

(b.) Duplicate Courts, Judges', Juries', and witnesses' rooms, Grand Jury rooms, robing-room, solicitors' and clerks' rooms, library, consultation-rooms, refreshment-room, room for members of the Press, lavatories, etc., public galleries, Records rooms, indictment office, etc.

There should be separate Civil and Criminal Courts provided, and sometimes also Chancery and Sheriff's Courts are wanted.

GUILDHALL AND
ASSIZE COURTS AT
SWANSEA.

Architect: Thomas Taylor



A residence for the Judges of Assize is also a desirable provision.

The above accommodation would form a fairly important building in the provinces, and frequently the list would be curtailed—as for example, only one Assize Court might be provided for all cases, the refreshment room is not indispensable, and even the Press room may be omitted; but on the other hand, a Wreck-Inquiry Court and other rooms may be required.

In considering the planning of the Court itself, the provision of gangway may well be restricted; the irreducible minimum should, in fact, be the guide though not the goal.

It will be found that 35 ft. by 25 ft. represents fairly accurately the smallest desirable Court, and the accompanying sketch (Fig. 3) indicates how such a hall would (or might) be utilised. The central dock should be of size sufficient to range about a half-dozen prisoners in line, and with the stairs from the cells

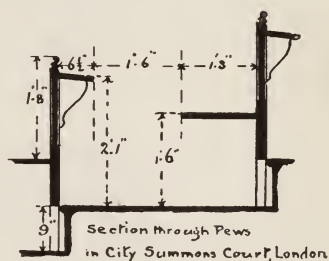


FIG. 4.

placed as shown, obviates the too close proximity of the prisoners to the legal corps, that might otherwise reasonably object. Two witness-boxes are desirable, one for each party to a civil cause. The Judges' room should not be less than 12 ft. square, and there should be a W.C. and lavatory attached to same. The Grand Jury room should not be less than 20 ft. by 13 ft., and Jury retiring room not less than 16 ft. by 12 ft. Other rooms will be planned according to varying circumstances. It may be noted here, that in the City of London Court, the seating dimensions are as shown in Fig. 4. It is to the above-mentioned alone that *primary* attention has to be given, the Court itself being of course the pivot on which every other room turns. The plan by Mr Thomas Taylor for the Swansea Assize Courts is given on Plate II.

Banking Premises.—(a.) Ample accommodation for the public and for the clerical staff; effective supervision of the former; adequate separation between the public hall and the official portion; seclusion of strong-rooms; provision of residential accommodation for manager or deputy.

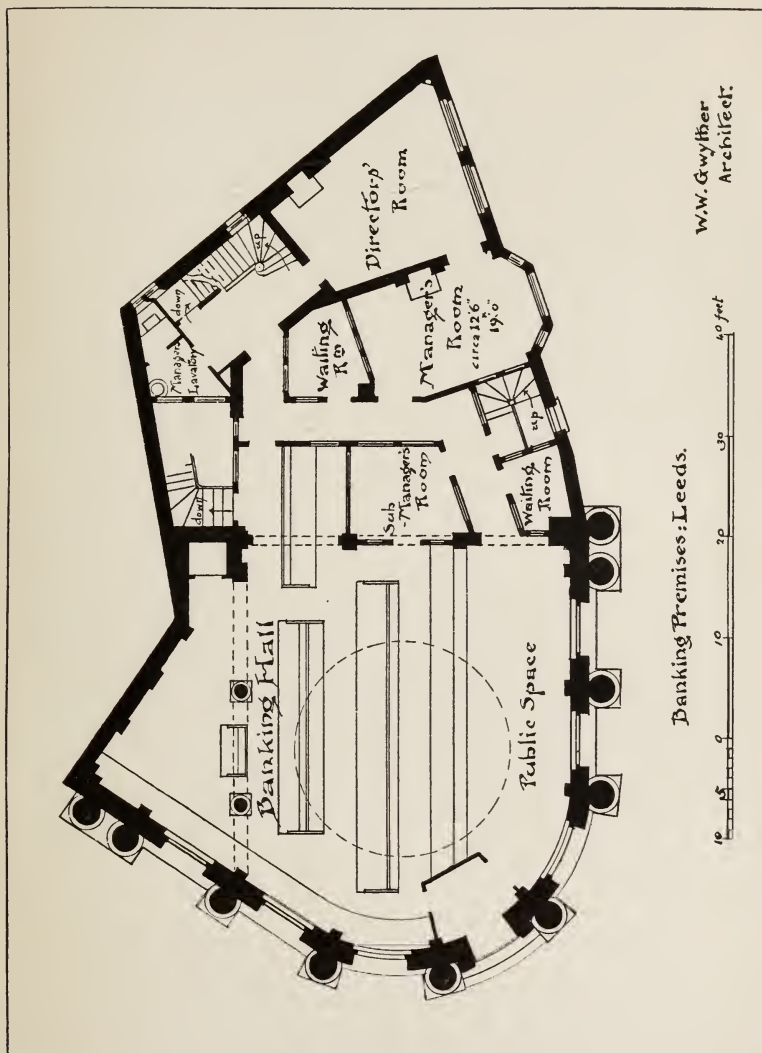
(b.) Public hall, cashiers' and clerks' department, manager's and assistant manager's offices, waiting-room, sometimes luncheon-room, strong-rooms for bullion and books, book-hoist, lavatories, W.C.'s and cloaks; residence (containing two living rooms, kitchen and offices, three or more bedrooms, bath-room, two W.C.'s, stores).

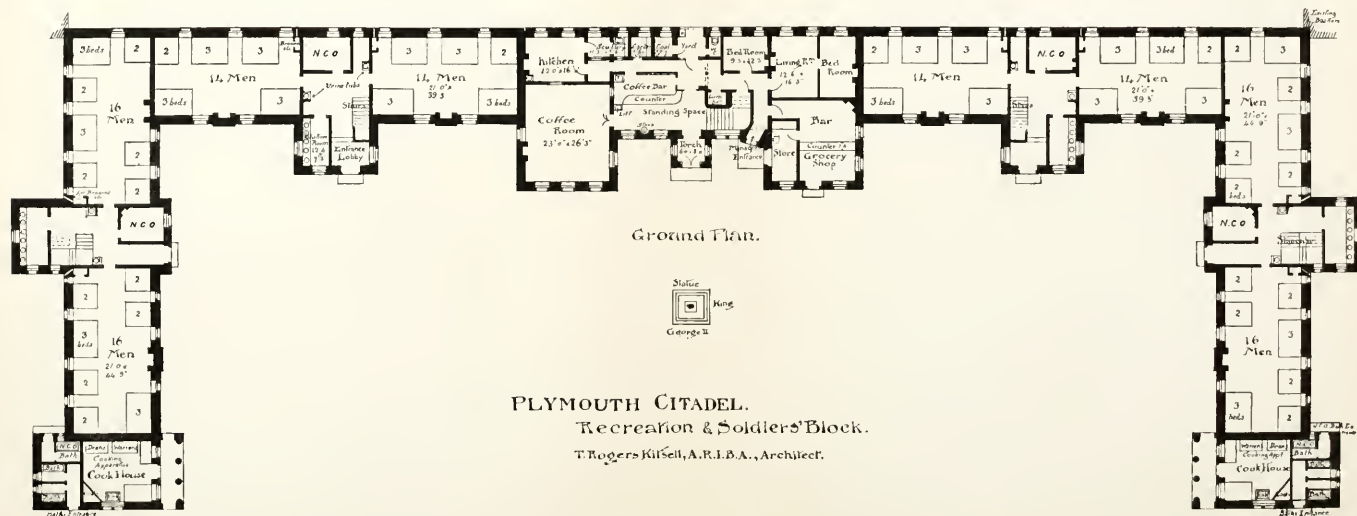
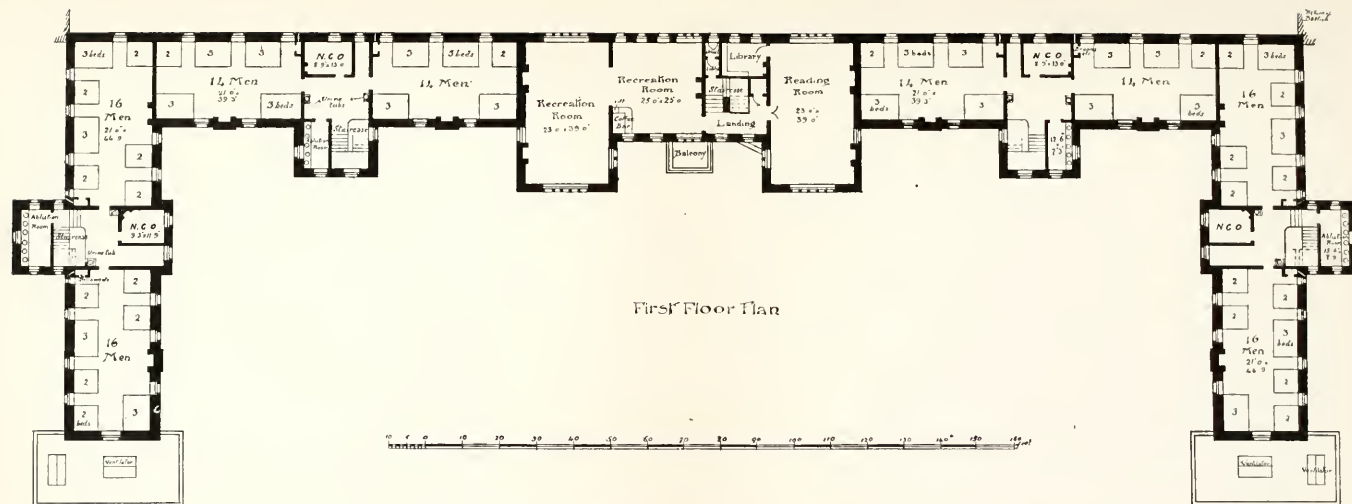
The basis of accommodation is the space required per cashier and per clerk. The former should be allowed 6 ft. by 2 ft. 9 in. counter space, 18 in. depth for standing room, and the gangway in rear should be not less than 2 ft. wide. Clerks should be allowed 2 ft. 6 in. by 2 ft. desk space, 18 in. depth for sitting space, and the gangway in rear should be not less than 2 ft. 6 in. wide. The public should have a depth of counter not less than 9 to 12 in. The more frequent to and fro carriage of heavy ledgers by the clerks renders necessary a greater width of gangway than in the case of the cashiers.

A plan by Mr W. W. Gwyther is given in illustration on Plate III.

Barracks.—(a.) Ample light, air and ventilation, residential and drill requirements, good open position.

(b.) Barrack-rooms and annexes, orderly-room, guard-room and cells, parade-ground, drill-shed, canteen, cook-house, reading and recreation rooms, baths, gymnasium and skittle alley, library, librarian's quarters, Offices and quartermasters' quarters, married sergeants'





PLYMOUTH CITADEL.

Recreation & Soldiers' Block.

T. Rogers Kitchell, A.R.I.B.A., Architect.

and soldiers' quarters, school-house, chapel, sergeants' mess establishment, infirmary and isolation blocks, mortuary, laundry, workshops, magazine, armoury and other stores, Officers' quarters (including also mess-room, billiard-room and servants' rooms), Officers' stable block, general stables, riding-school, latrines, etc.

The provision of Brigade Dépôt Barracks is carried out in accordance with regulations of the Barracks Improvement Commission 1861, *et seq.* Only a few remarks are necessary here.

It may be noted in the first place that eight barrack-rooms are as a rule provided in a dépôt, to house 224 privates and eight N.C.O.'s. These are planned as two-storeyed double pavilions (one block for each company), thus giving two blocks in all. The private soldier takes his food in these rooms ordinarily. A floor space is allotted of about 60 ft. super. per individual (*i.e.*, 5 ft. 6 in. run of wall by 11 ft. depth to centre of room). To each of these barrack-rooms, an ablution-room, a W.C., and a sergeant's room are attached, and the requisite approach and staircase also. The married men are provided with living room, scullery and bedroom. The sergeants' mess establishment contains mess-room, kitchen, larder, and cook's room. The officers are accommodated with one, two, or three rooms, according as they are of subaltern, captain, or field officer rank respectively. The infirmary contains accommodation for about 6 per cent. of the soldiers in residence, and besides the ward, etc., contains also surgery, orderly's room, cook's room, waiting-room, kitchen and its offices, etc.

It has been noted above that a good open position is advantageous, and this is the case not only from a sanitary standpoint, but also as a means of attraction to the populace to join the ranks of the army, to which aim a parade is a powerful incentive. This is not of importance, however, in those countries that levy conscription.

It may be noted here that the proportion of married privates allowed in a company is 6 per cent. approximately.

Cavalry stables are planned for a double row of horses with central passage 12 ft. to 13 ft. wide ; each horse in stall is allowed about 100 ft. super., exclusive of gangway. The loose boxes are planned 17 ft. by 12 ft.

Infirmary stables are planned for only a single row of stalls, and each horse is allotted about 130 ft. super. The guard-room, cells, etc., are provided in a block called the "Keep."

Plans of a block designed by Mr Roger Kitsell are given on Plate IV.

Baths and Wash-houses (Public).—(a.) Ample water-area, good entrances and corridor communication, top-lighting preferable for the baths themselves, grouping, economy of heating arrangements.

(b.) Swimming baths with or without galleries, slipper, douche, spray, Turkish baths, etc.; dressing-boxes, waiting-rooms, W.C.'s, etc.; attendants' boxes, wash-house, drying closets, mangling and ironing room, trolley-shelter, cloak-room, pay-boxes, superintendent's offices and residence, committee-room, stores, workshops, establishment laundry, mess-room, boiler-house, engine-house, etc. Frequently also club and refreshment rooms are provided; and the provision of a crèche in connection with the public wash-houses is growing in favour.

The provision of these establishments, though highly commendable, leaves room for doubt as to the wisdom of the methods usually employed in England. It is not intended to enter here with any detail into the advisability or otherwise of decentralisation. The existing English method is to have large central establishments, and it is such will be now considered.

Should there not be any desire to utilise the swimming baths as entertainment halls, the planning will be to this extent simplified, at any rate where the jurisdiction of the London County Council (and similarly stringent authorities) is concerned.

But these establishments should in any case face two thoroughfares at least. There are two distinct portions, viz., the semi-recreative "baths" portion, and the utilitarian "wash-houses"; they should be kept quite separate, and may well be planned to be entered from different streets. Instances are frequent, of course, where merely the public baths are provided, but for present purposes it will be better to deal with the combined requirements.

Where space is ample, separate entrances may be provided, if desired, for the various "classed" baths, as well as for the two sexes. Where space is limited, an entrance for each sex may suffice, and indeed some people would contend that one entrance from the street can be condoned, and has certainly been employed. But undoubtedly it is better that ladies should not be compelled to choose between the risk of being shouldered by the rough third-class element of the male sex, or of avoiding the use of the establishment altogether.

After leaving the pay-box, there should be a parting of the ways to the different-classed baths, and it should be unnecessary to urge the absolute separation and privacy of the males' and females' portions of the buildings.

As this work does not purport dealing in detail with any class of building except so far as principles are concerned, but very few more words are necessary. It may be noted that there should be adequate supervision throughout.

The administrative portion is well provided for in basement rooms, and it is well to form pipe ducts underneath the gangways of the swimming baths.

The swimming baths may be any convenient size, but by preference may be some multiple of a yard lineal both in length and width on account of racing contests. The dressing-boxes for men vary from 3 ft. 6 in. square to 4 ft. square; for women, the boxes may be conveniently 4 ft. by 4 ft. 6 in. Side gangways should be not less than 3 ft. 6 in. wide; the end gangways are usually wider, provision being made for a diving-board and stage, a water-chute, etc. Slipper baths are usually about

36 ft. super. Soap and douche baths may occupy the size of a dressing-box in the large bath-halls.

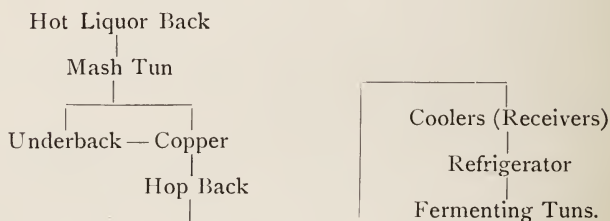
The washing-boxes in the wash-house should each be 3 ft. 6 in. wide by 3 ft. depth, and there should be a gangway 6 ft. in width between the sets of compartments.

See Plates V. and VI. for plans of the new baths and wash-houses in St Pancras, London, by Messrs T. W. Aldwinckle & Son.

Brewery.—(a.) Accommodation according to the size and capacity of the “plant,” plenty of storage, well-water supply desirable, ample space, light and ventilation, room for extensions, aspect, grouping.

(b.) Boiler and engine house, tun-room, fermenting-room, refrigerating-room, washing-room (with coppers); workshop, stores, Offices, stabling and cart-sheds, sometimes a bottling-room, and frequently a manager’s residence. If a “malting” is combined, then barley, hop, and malt stores will be required, and a malt-kiln also.

In breweries a definite sequence of rooms is requisite, dependent on the various processes in brewing, and this may be understood from the annexed diagram :—

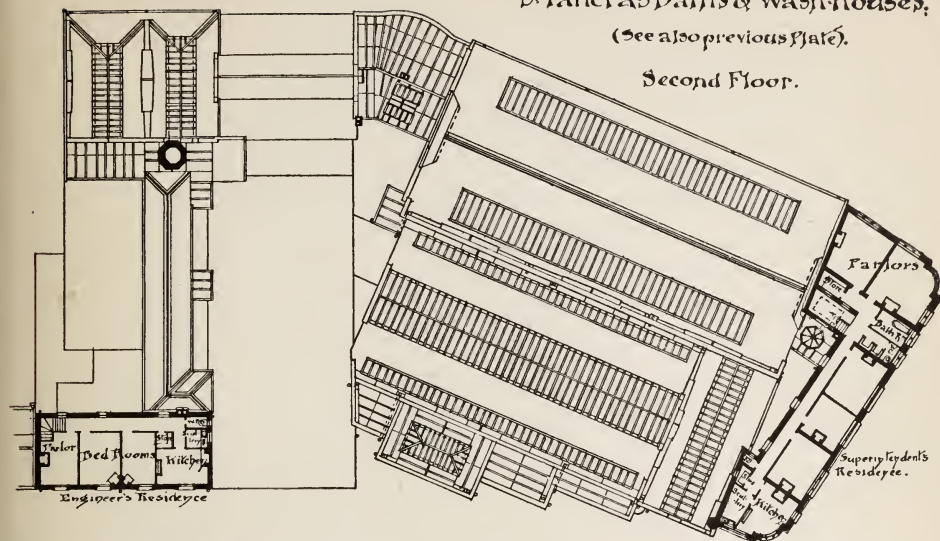


A hoisting apparatus, called “Jacob’s Ladder,” is frequently employed to carry the malt up to the top of the building at the commencement. From the hot liquor back to the hop back, the process is one of gravitation. It is customary to pump the

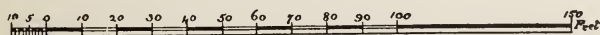
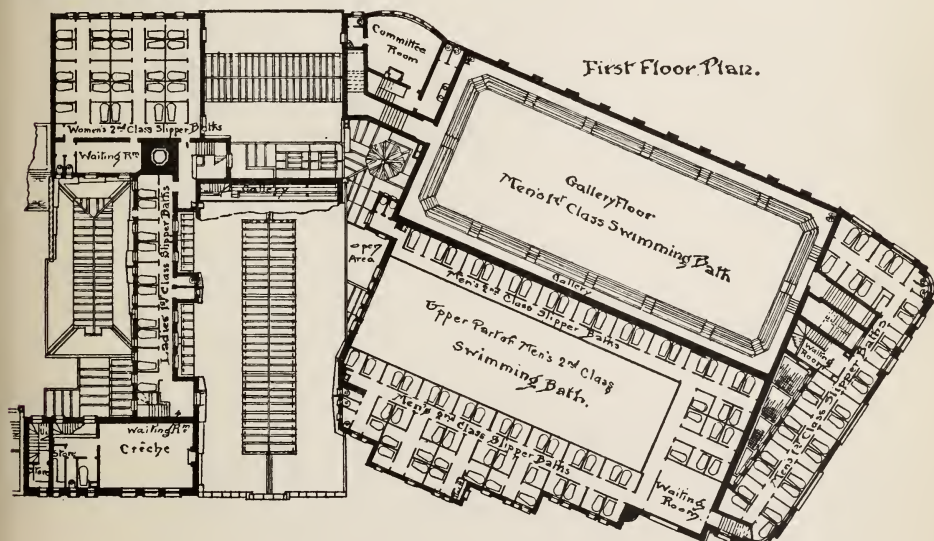
Paneras Baths & Wash-houses,

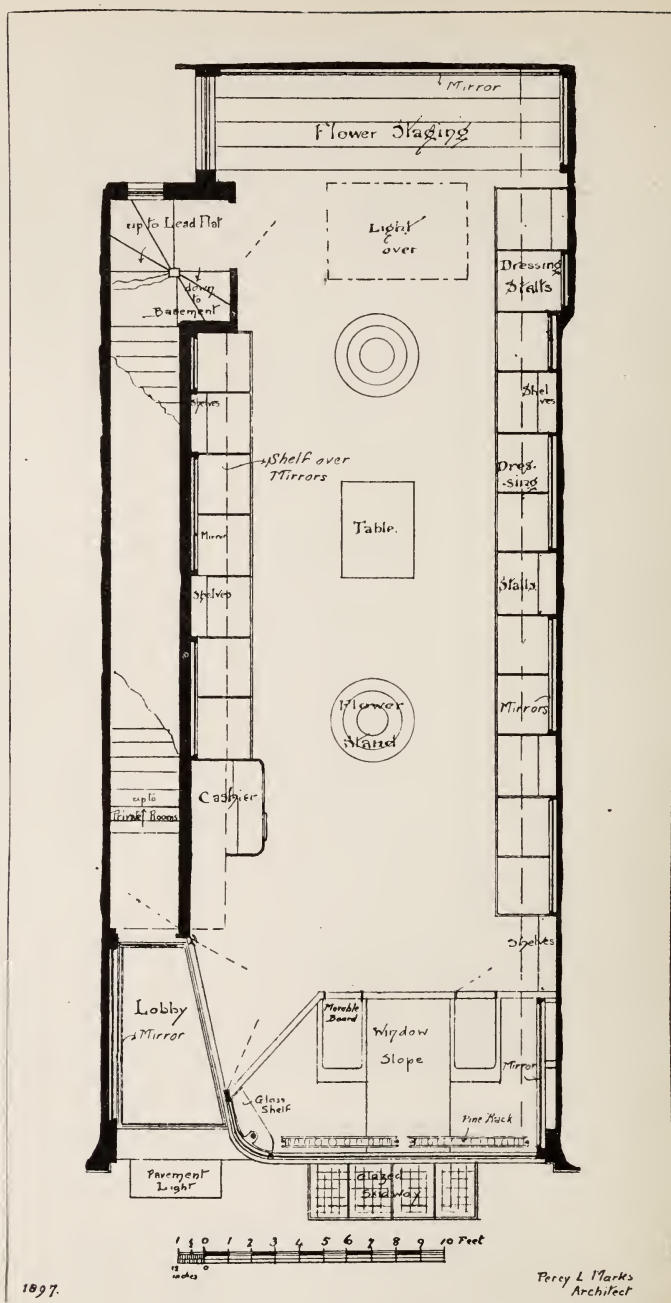
(See also previous Plate).

Second Floor.



First Floor Plan.

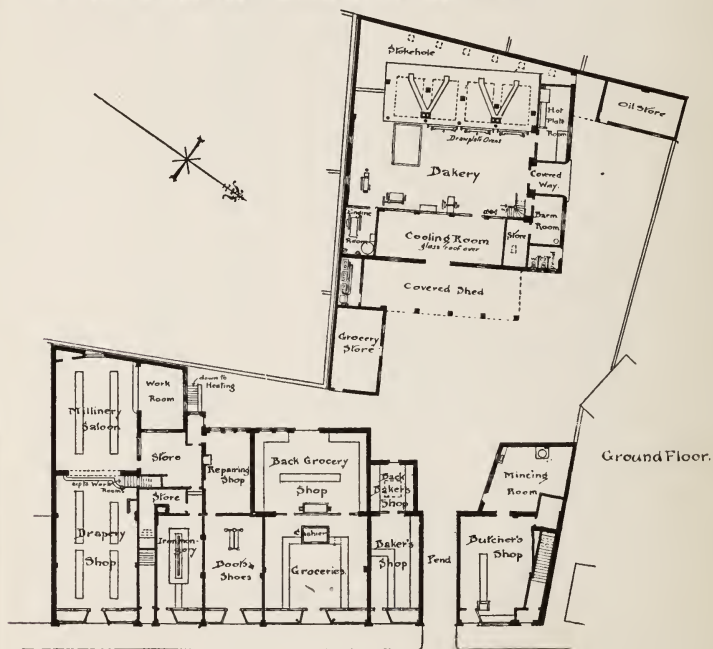
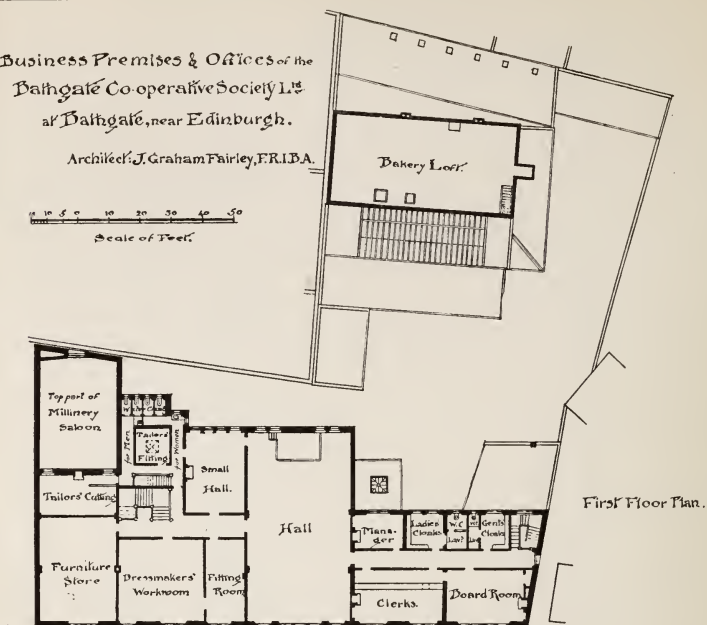
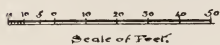




THE FITTING-UP OF A FRUITERER'S SHOP.

Business Premises & Offices of the
Bathgate Co-operative Society Ltd.
at Bathgate, near Edinburgh.

Architect: J. Graham Fairley, F.R.I.B.A.



“wort” * thence into the coolers, otherwise the buildings would necessitate being carried to such a height as would prove inordinately expensive.

A sketch of a 5-quarter plant Lager brewery by Mr Kinder is given on Plate VII.

Business Premises.—(*a.*) Ample light, air and space, good arrangements for display.

(*b.*) The accommodation required may be anything, from a mere shop of the smallest dimensions (such as may be seen in the case of No. 1A Parkside, Knightsbridge, in London), through all the intermediate stages up to and including show-rooms (and their accessories), counting-house, store-rooms, packing and delivery rooms, workrooms, manager’s room, etc. etc.

The requirements varying so widely, it would be impossible in a work of this nature to attempt to illustrate fully the various classes of shop premises; the example shown on Plate VIII illustrates the fitting-up of a fruiterer’s shop. The depth of show-window varies again with the business. In the case of a fruiterer’s shop, 6 ft. to 8 ft. is not too much. A confectioner would require only 2 ft. to 2 ft. 6 in., a chemist the same, a general draper 5 ft. to 7 ft. or more, etc. etc. It depends naturally upon the manner of dressing the window.

On Plate IX. plans of Co-operative stores designed by Mr Graham Fairley are given, and for a book of this kind are interesting in their comprehensiveness.

Café.—See under “Refreshment Rooms.”

Cattery.—See under “Outbuildings.”

Central Station.—See “Electric Power Station.”

* “Wort” is the new unfermented or fermenting beer.

Chapel, Church, and Synagogue.—(a.) The requirements for ministration and congregation; efficient side lighting, acoustic requirements, symmetry, orientation.* It must also be remembered that Roman Catholic and Jewish fanes must be schemed with a view to processions as part of the ritual. Facilities for the free movement of communicants have to be considered.

(b.) The accommodation required in a Protestant Church may be nave, aisles, transepts, chancel and sanctuary, sacristy, vestries, galleries, organ chamber, heating chamber; sometimes baptistery and morning chapel, cloak-rooms, etc.

Though a baptismal font is a requisite, it is not always placed in a baptistery. Cathedrals are to a great extent magnified churches; but there is additional accommodation in chapter-house, residences in connection, etc. etc.

(b.) The accommodation required in a Roman Catholic Church may consist of all the provisions just mentioned, and, in addition, there must be "saints' chapels," "confessional boxes," and presbytery.

A greater proportional space at the altar is wanted in these churches, as there are more individuals taking part simultaneously in the conduct of the service.

(b.) A Nonconformist Chapel may consist of only nave and (perhaps) galleries, with a vestry, heating chamber, etc. It may be elaborated, as is frequently the case with Wesleyan and other chapels.

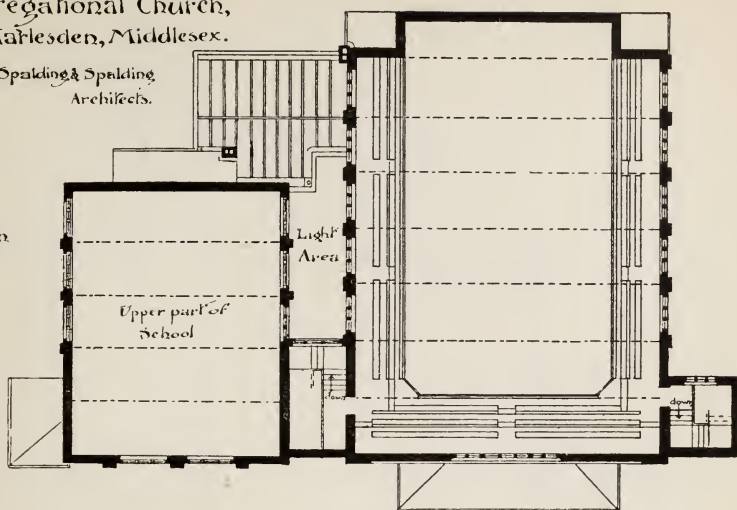
The varieties of Nonconformist edifices are indefinite, though not perhaps infinite. A mere parallelopiped satisfies the requirements of some of the three hundred and odd sects that

* Orientation seems to be much less considered in places of worship nowadays than it was in former times.

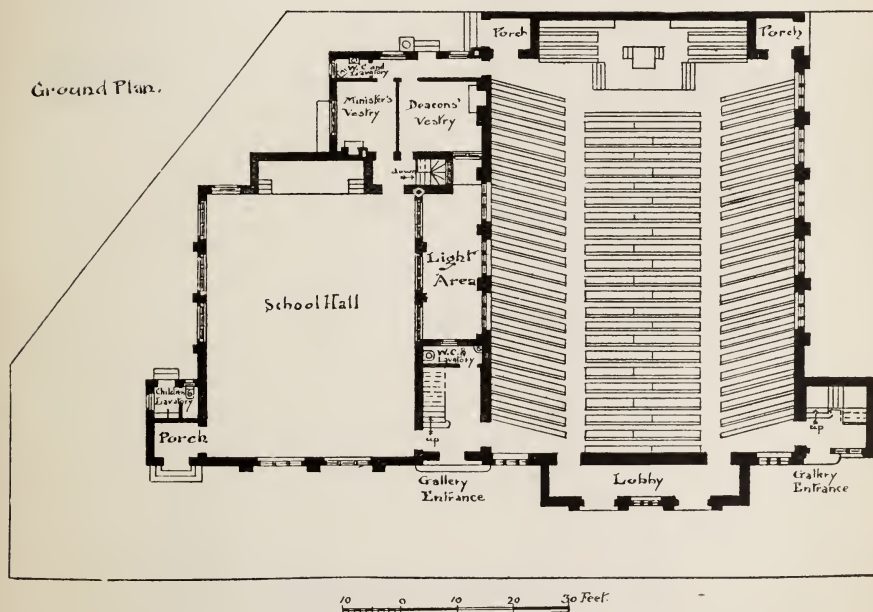
Congregational Church,
Harlesden, Middlesex.

Messrs Spalding & Spalding
Architects.

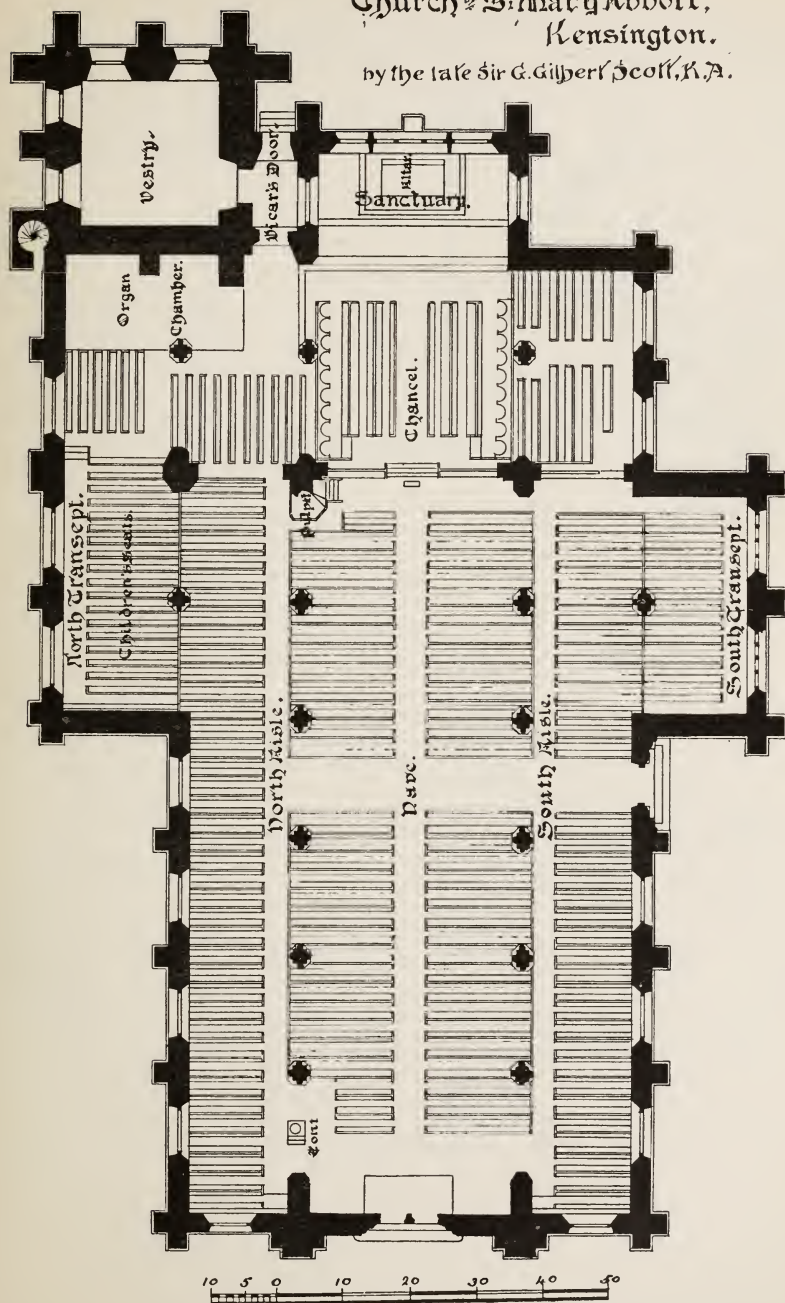
Gallery Plan

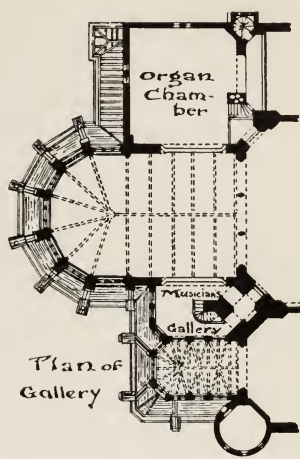
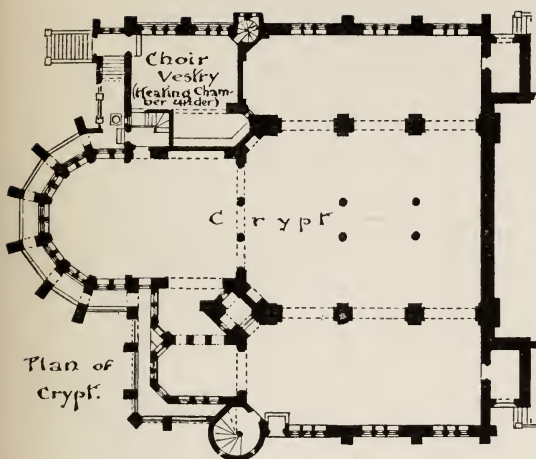


Ground Plan.



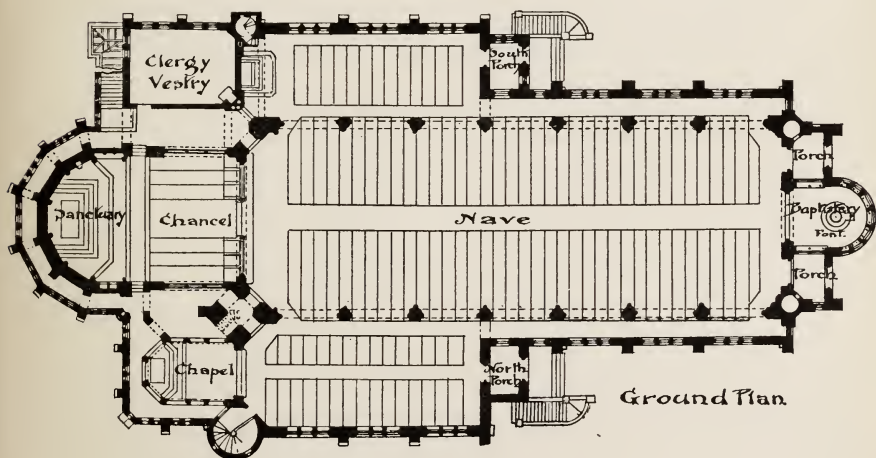
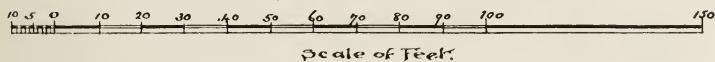
Church of St. Mary Abbott,
Kensington.
by the late Sir G. Gilbert Scott, R.A.





All Saints Church: West Dulwich.

Architect: G. H. Fellowes-Prynn, F.R.I.B.A.



make up the religious communities of this sphere. An example of Congregational church planning is shown on Plate X.

A plan of St Mary Abbott's Church at Kensington, London, by Sir G. Gilbert Scott, is given on Plate XI, as an illustration of an interesting church by an interesting architect; but the pewing is overcrowded. On Plate XII. are given plans of a modern church designed by Mr Fellowes Prynne.

The basis of accommodation is the space requisite per individual member of the congregation, and this has been calculated and regulated by the English Church Commissioners (for places under their authority) at not less than 1 ft. 8 in. by

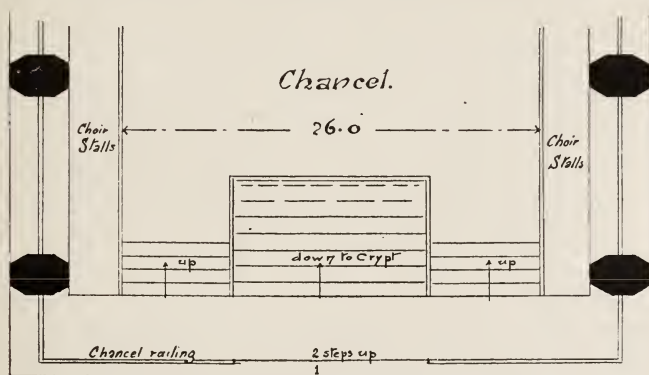


FIG. 5.—SKETCH OF CHANCEL—ARCHITECT UNKNOWN.

2 ft. 10 in. per sitting; for free places they allow 1 ft. 8 in. by 2 ft. 3 in. These are for adults. For children, they allow 1 ft. 2 in. by 2 ft. 3 in. The first dimension in each case is the width, and the second is the clear distance between one pew-back and another. If chairs are used, a calculation of 7 ft. super. each, inclusive of use of gangway, should be allowed. The least dimensions for communion tables* are 6 ft. 6 in. by 1 ft. 10 in., and in the Church of England Ritual, a specific number of steps forms the approach from nave to sanctuary.

Morning chapels are growing in favour, and are provided with communion table.*

* Protestants and Nonconformists usually call these Holy (or Communion) Tables, Roman Catholics habitually call them "altars."

The special requirements of the different rituals must be fully attended to. In some sects, ritual is conspicuous by its absence, and a mere nave should suffice to answer the purposes of a meeting-house. In cathedrals, crypts are frequently met with and have their uses both hygienically and otherwise; where a crypt is desired, it can be effectively entered somewhat as in Fig. 5.

St Etheldreda's, off Holborn, is a two-storeyed church, the crypt with its altar at the west end, and the upper church with the usual east-end altar; this is a Roman Catholic church, and is an instance of unusual planning, the approach by way of a side cloister being perhaps unique, but not desirable for imitation.

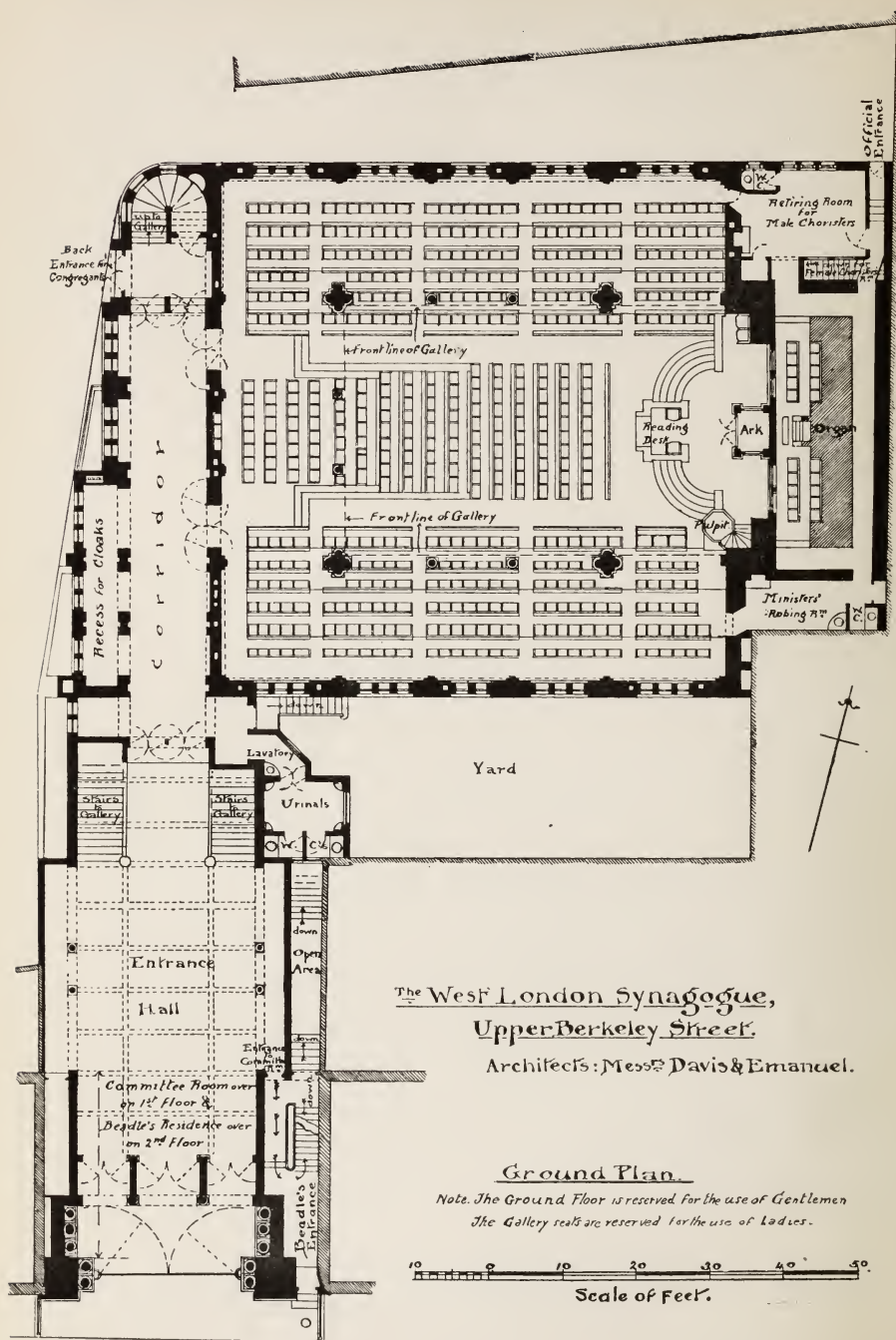
(b.) A Synagogue requires for ritual purposes a Reading Forum ("Al Memar"), "ark," choir seats (as a rule), wardens' pew, pulpit and vestry. Other requisite accommodation consists of pews for the congregation (for men in the body of the building, and for women in the galleries), cloak-rooms, lavatories, etc., narthex, heating chamber.

A "Succah"* has to be borne in mind when planning the synagogue; this is only required for use during one week in each year. Committee and class rooms and beadle's residence are also frequent provisions.

The congregation should be slightly benefited in accommodation beyond the dimensions given elsewhere for church and chapel sittings, as there is apt to be more perambulation on the part of individuals due to their active participation in the ritual. 1 ft. 8 in. by 3 ft. should be the minimum for the unit of pewing.

The Jewish Ritual necessitates the segregation of the sexes, and this is met by installing women in the galleries, as they have not any such active participation in the service as noted above. The best position for the choir is still debated in Jewish circles. The matter cannot be so easily decided as

* A "Succah" is a chamber or enclosure commemorative of the booth-dwellings of the Israelites during their forty years' sojourn in the Wilderness. It must be provided with a section of moveable roof.



in Christian places of worship, as it is customary for Jews to dispense with instrumental music. The Gordian knot is successfully disposed of when there is not any choir, the singing being congregational. The "Al Memar" should be of a size to accommodate the Reader and some six to eight people in addition.

The "ark" usually assumes the form of an enclosed shallow recess at the extreme end of the synagogue (usually and by preference the eastern end). It is provided for the reception of the "scrolls of the Law"—seven or eight or more in number. It is customary to provide a "narthex," which is a distinctly useful feature, and gives an air of completeness to a building of this class; cloak-rooms, lavatories, and gallery stairs open off this glorified vestibule, as frequently also does a vestry.*

The Synagogue illustrated on Plate XIII., though not typical from the orthodox Israelite's standpoint, is full of interest and information.

Club-house.—(a.) Generous and effective planning, good lighting, kitchen administration.

(b.) Entrance and inner halls; waiting and reception rooms; cloak-rooms, lavatories, etc.; coffee-room; morning-room; general and members' dining rooms; billiard, smoking, and card rooms; library, committee-room, secretarial offices; numerous bedrooms, bath-rooms, etc.; kitchen, scullery, servants' hall, chef's room, pantries, larders, stores and cellars of all kinds, lifts, staircases, mess-room, boiler, dynamo and engine houses (the latter if electric current and hydraulic power have to be generated on the premises).

Club-houses are of all kinds, to suit all purposes, but there is one feature in common to all, and that is the recreative.

In the case of the houses for the so-called upper and middle

* For rules affecting staircase planning in metropolitan buildings of this class, see Appendix A.

classes, this feature is all-important, and it is merely a matter of degree in satisfying its demands. They may be broadly classified as non-residential (Salon) and residential Clubs. Of the latter, the Constitutional Club, London, is a good example, though the bedroom floors are not of sufficient general interest for illustration within; the plans shown on Plates XIV. and XV. are those carried out by the architect between fifteen and twenty years ago.

Salon Clubs, such as the Travellers', the Service Clubs, etc., in London, do not need to be shown here, as the social and domestic portion of Mr Edis' Constitutional Club will adequately serve the purpose of illustration. On Plates XVI. and XVII., however, are shown plans of a provincial Club-house designed by Mr F. B. Osborn, in which building the residential feature is very little in evidence.

The distinctions attaching to various Clubs, whether political, sociological, social, scientific, or otherwise, do not, to any appreciable extent, affect the planning, and consequently need no further comment here.

There are other Clubs, however, whose planning is very considerably modified as a result of their particular requirements.

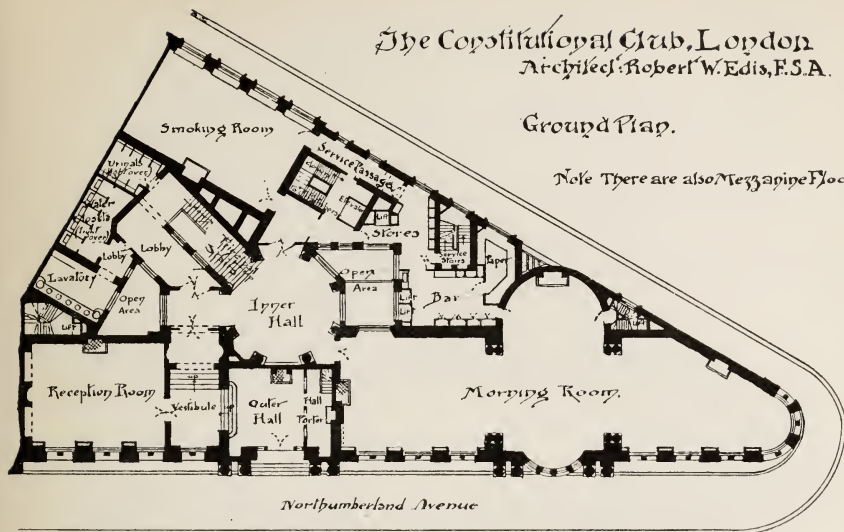
Sports Club-houses, such as for Angling, Yachting, Shooting, Golfing, etc., are satisfied with much simpler accommodation. As an example, a Golf Club-house in Surrey designed by Mr H. O. Cresswell is illustrated on Plate XVIII. It will be observed how very little variety of accommodation is needed in such a house, and it is of interest to note the special requirements in lockers, caddies' room, etc. Yachting and Rowing Club-houses would as a rule have a boat-house as an integral portion.

When Working-men's Clubs are under consideration, the recreative aspect is still most in evidence; but a large hall is a not infrequent provision, where lectures with limelight illustrations can be given, thus serving the purpose of pleasing the men with the effects, whilst they feel at liberty to ignore the solid portion of the entertainment. Clubs for working lads and girls make a distinct feature of the educational side; these

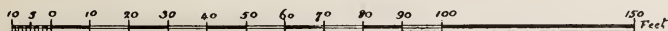
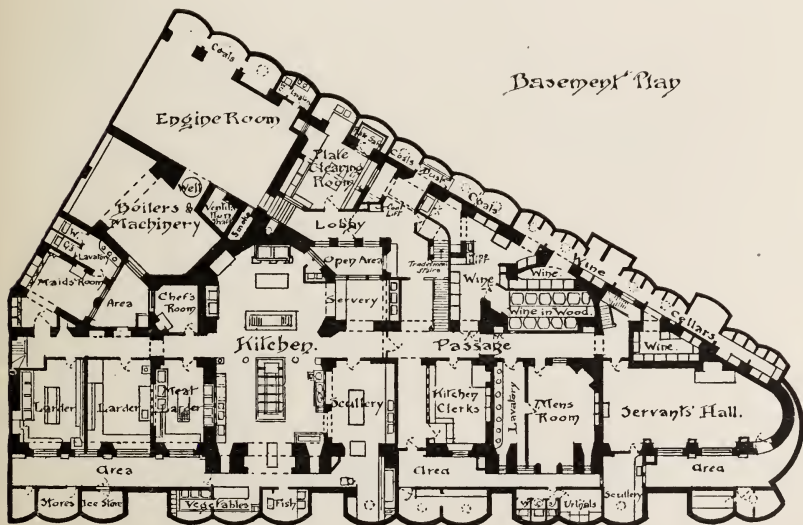
The Constitutional Club, London
Architect: Robert W. Edis, F.S.A.

Ground Plan.

Note There are also Mezzanine Floors



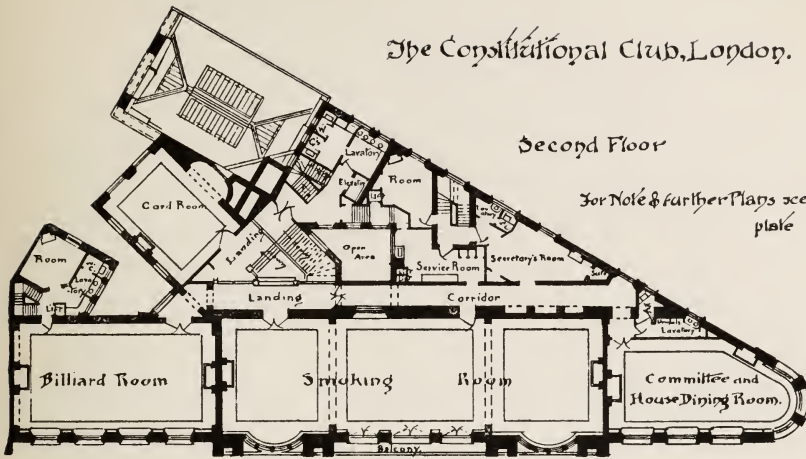
Basement Play



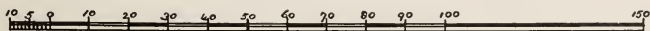
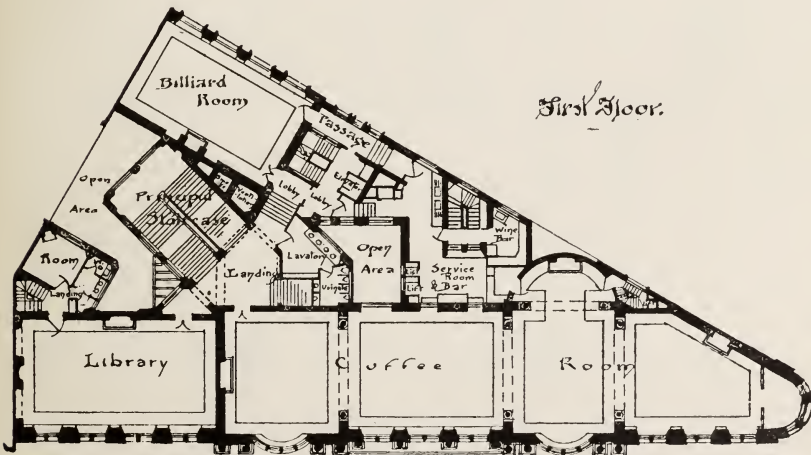
The Constitutional Club, London.

Second Floor

For Note & further Plans see previous plate

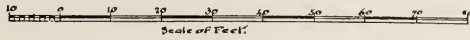


First Floor

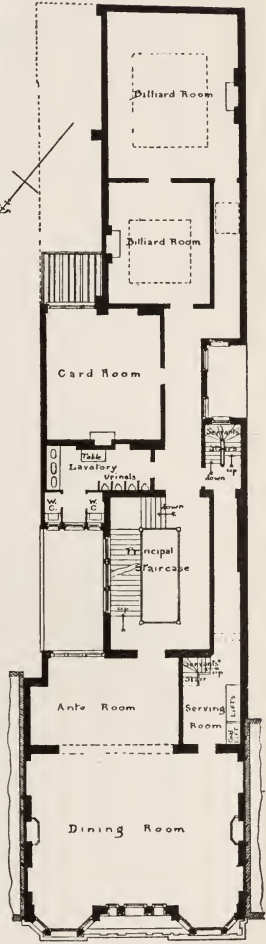
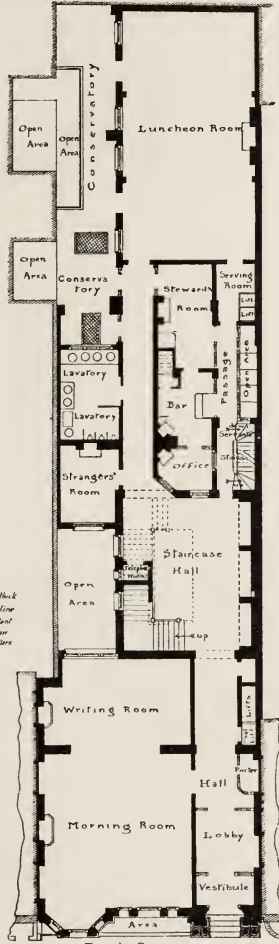


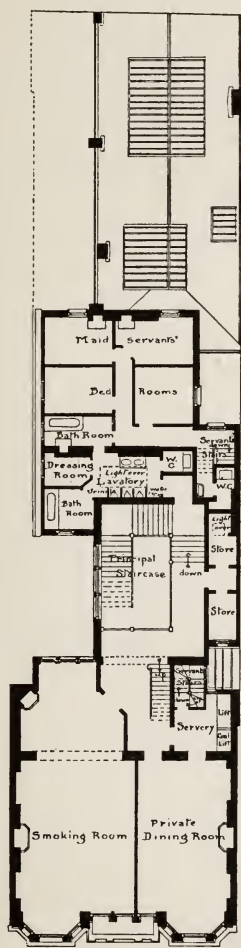
The Conservative Club: Birmingham.

Architect Frank D. Osborn, F.R.I.B.A.



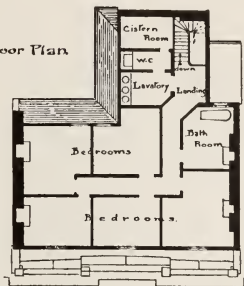
Note. See next Plate also.



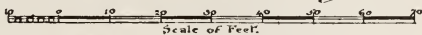


Second Floor Plan.

Fourth Floor Plan

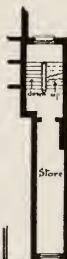


The Conservative Club, Birmingham.

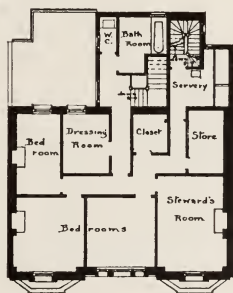


Note. See previous Plate also

Mezzanine Plan between First & Second Floors showing Store Room.



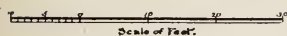
Mezzanine Plan between 1st & 2nd Floors showing Butler's Pantry.



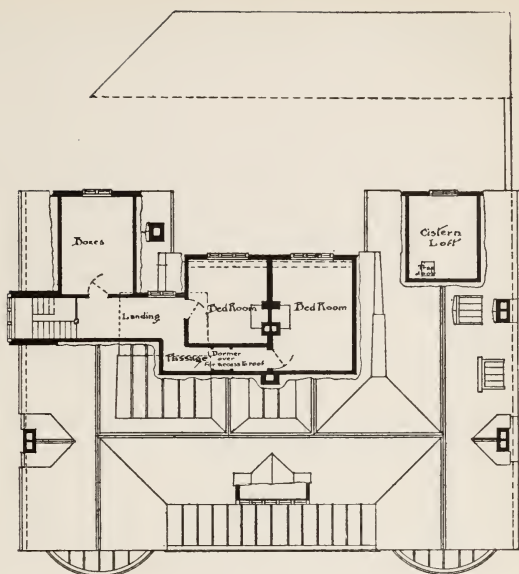
Third Floor Plan.

London Scottish
Golf Club House:
Wimbledon Common,
Surrey.

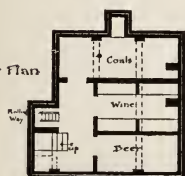
Architect H. O. Cresswell, F.R.I.B.A.



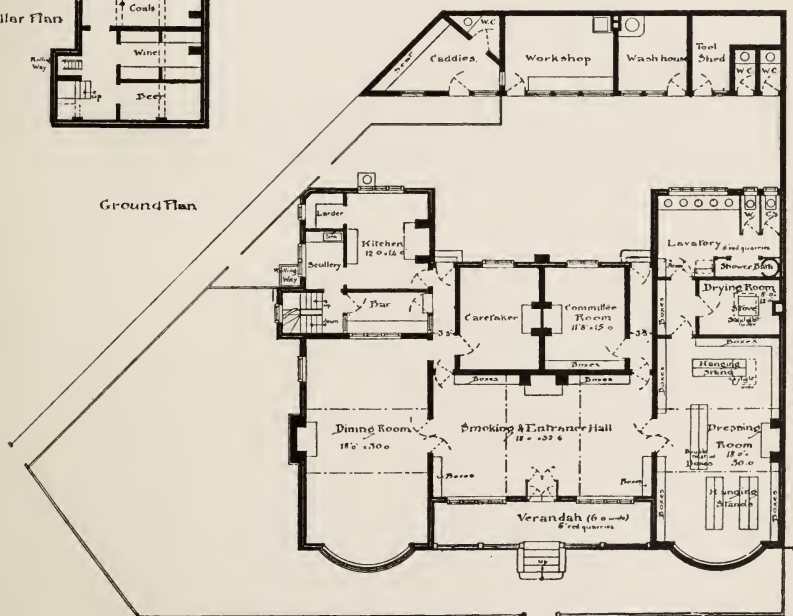
Attic Plan

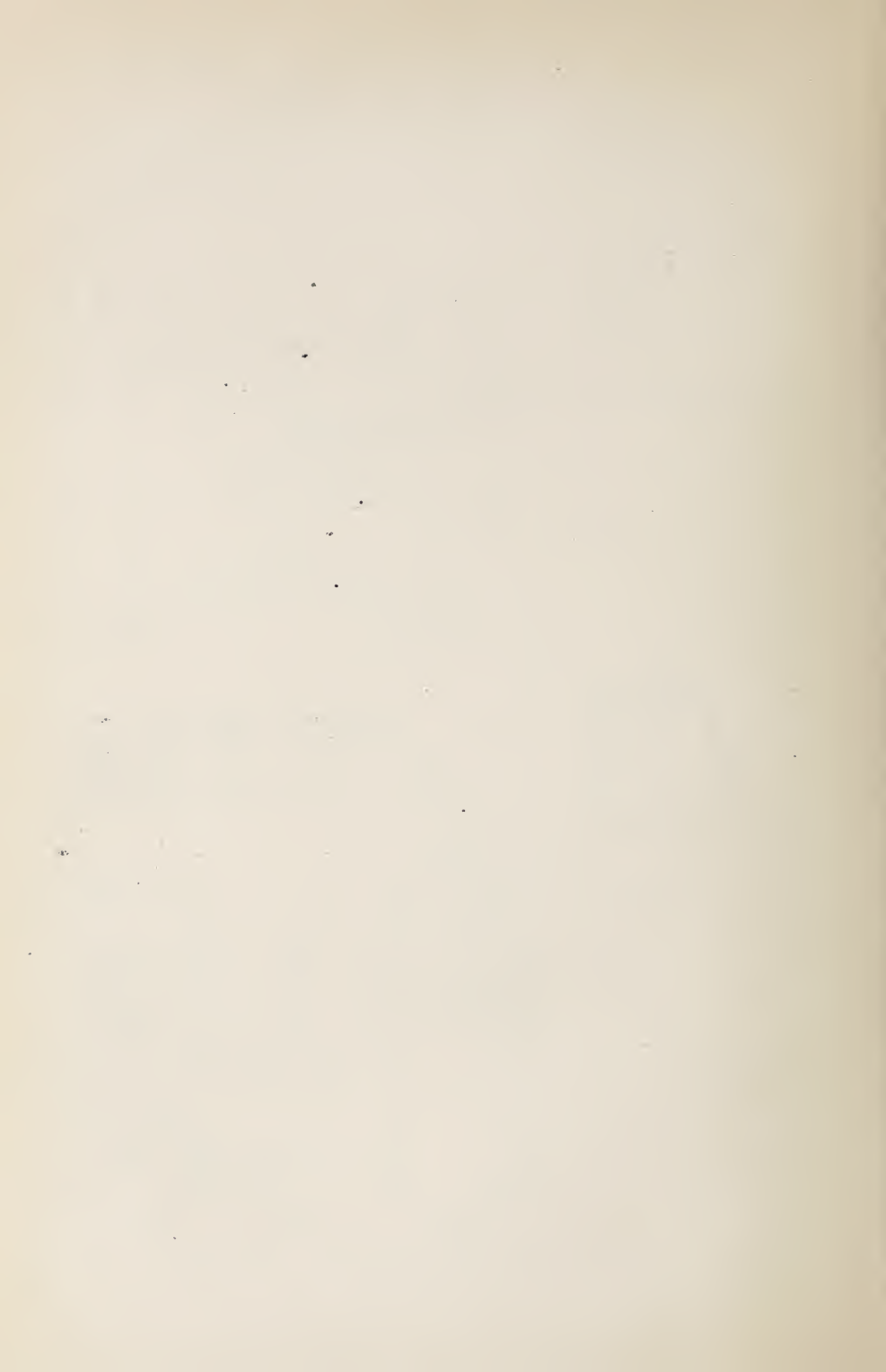


Cellar Plan



Ground Plan





establishments are primarily for the elevation of the working classes (to use the current but ineffective phrase), the process being to commingle serious study and pleasing relaxation. Remarks on the sociological results are not in place here; it suffices to note that the accommodation required will be classrooms, whose number will vary according to the necessities of each Club, a large hall for lectures and entertainments, cloak-rooms, reading-room and tea-room, and a committee-room should also be provided, placed near the large hall, and thus able to act also as the artistes' retiring-room. The seating arrangements in the large hall should not be fixtures, but merely loose fittings, and by preference chairs, not forms. Panic exits should be a provision, not that the numbers in the building would be often extensive, but at times there would be special gatherings of the members and their friends, and on these occasions, experience has demonstrated the wisdom of having extra exits.

Coach-house.—See Stables under "Outbuildings."

Commercial and other Offices.—(*a.*) Good lighting of corridors and staircases; avoidance of trivial alterations in level of any single corridor; numerous (in preference to spacious) offices.

(*b.*) Single rooms or suites; if for a large business, may include manager's, secretarial and clerical offices, sometimes a Board-room; waiting and telephone rooms, W.C.'s and lavatories, and perhaps rooms for hats and coats.

Concert Hall.—(*a.*) The requirements for artistes and audience; natural lighting, acoustic requirements, adequate entrances and exits, accommodation for organ and orchestra,

(*b.*) Auditorium and platform, tiers, entrance-hall, pay-box, crush-room, cloak-rooms, lavatories, etc., saloon bars, artistes' rooms, stores, caretaker's rooms.

In a large hall, the accommodation required consists principally of a repetition of some of the above requirements. The basis of accommodation is as for theatres. See also under Appendix B. for the London County Council Regulations for the metropolis.

A width of not less than 2 ft. 6 in. between rows should be allowed for choir, and not less than 3 ft. for orchestra.

Cow-house.—See under "Outbuildings."

Cycle-house.—See under "Outbuildings."

Dairy.—(*a.*) Aspect, ventilation, seclusion from "conveniences."

(*b.*) Milk-room, churning-room, scullery, cheese-making room, drying-room, storing-room, lavatory (but not water-closets, etc.).

The amount of accommodation varies of course with the nature or extent of the work performed. Frequently the dairy consists merely of a room attached to the domestic offices, but where the processes are to be carried out on an extended scale, the dairy should be a detached building. In any case, water-closets and such-like should be kept well removed from the process-rooms and stores, and by preference should not be provided in the detached building. Sizes of rooms cannot well be given, everything depending upon the required accommodation. A lavatory basin with hot and cold supply should be provided in a separate apartment in the building, and a cloak-room is also requisite. The building must be most efficiently ventilated. Bye-laws made under the Public Health Acts of 1875 and 1891 are issued for the regulation of public dairies in the extra-metropolitan and metropolitan areas respectively.

Dining-rooms.—See under "Refreshment-rooms," etc.

Electric Power Station.—(a.) Proximity to rail, canal or river, good approach by road, adequate space for extension of site, level site.

(b.) Engine-house, boiler-house, store-houses, mess-rooms, offices, chimney shaft, water-tower, pump-room, accumulator room, workshops, car-sheds, caretaker's rooms, etc.

The provision of central stations (for this is the generic name by which they are now known) is one in which the combined services of architect and engineer are requisitioned. The two chief purposes for which these stations are erected are of course for the generation of electricity either for (1) lighting or (2) tram traction, or more frequently for both purposes. There are other uses, but they are more in the nature of adapting provisions to possibilities, such as dust-destroying, artificial stone manufacture, etc. The provision of dust-destroyers has this interesting feature worthy of notice, namely, that the heat engendered by burning communal refuse aids in the provision of steam for working the engines which in their turn work the electro-producing dynamos, and these very dynamos provide the power for working the dust-destroyers. It is a modern instance of the mystery attaching to the hen and the egg, that is to say, which initiates the generation, the dust-destroyer or the dynamo?

It is not possible to give here detailed particulars of requirements in a Power Station. In each case it will be necessary for the engineer to determine what available power there must be in every twenty-four hours, namely, the quantity required for lighting and for traction; and he also will determine (as between himself and the architect, that is to say, for there will be a committee with whom he will previously consult) the nature of the supply, whether high or low tension, alternating or direct current, the kind of boiler, engine and dynamo to be employed, the method of boiler-feeding and all such interesting points. It will be for the architect to provide a building to suit these

requirements and conditions, and his experience will prove valuable in the matter of grouping the accommodation and in specifying and superintending the construction.

An important point to bear in mind is, that whatever plant is laid down should not be required to be disturbed for future extensions, and that these extensions should also be considered by the construction of those portions of the future requirements in flues and underground conduits which, if not constructed with the original work, would necessitate the displacement of same for the purpose. The effects of vibration resulting from the use of powerful engines must also be borne in mind, the concrete bedding and foundations generally being adapted to individual requirements.

There is considerable difference of opinion as to the kind of boiler to be used, whether the Lancashire type, the water-tube or other type: similarly with engines, whether they shall be vertical or horizontal.

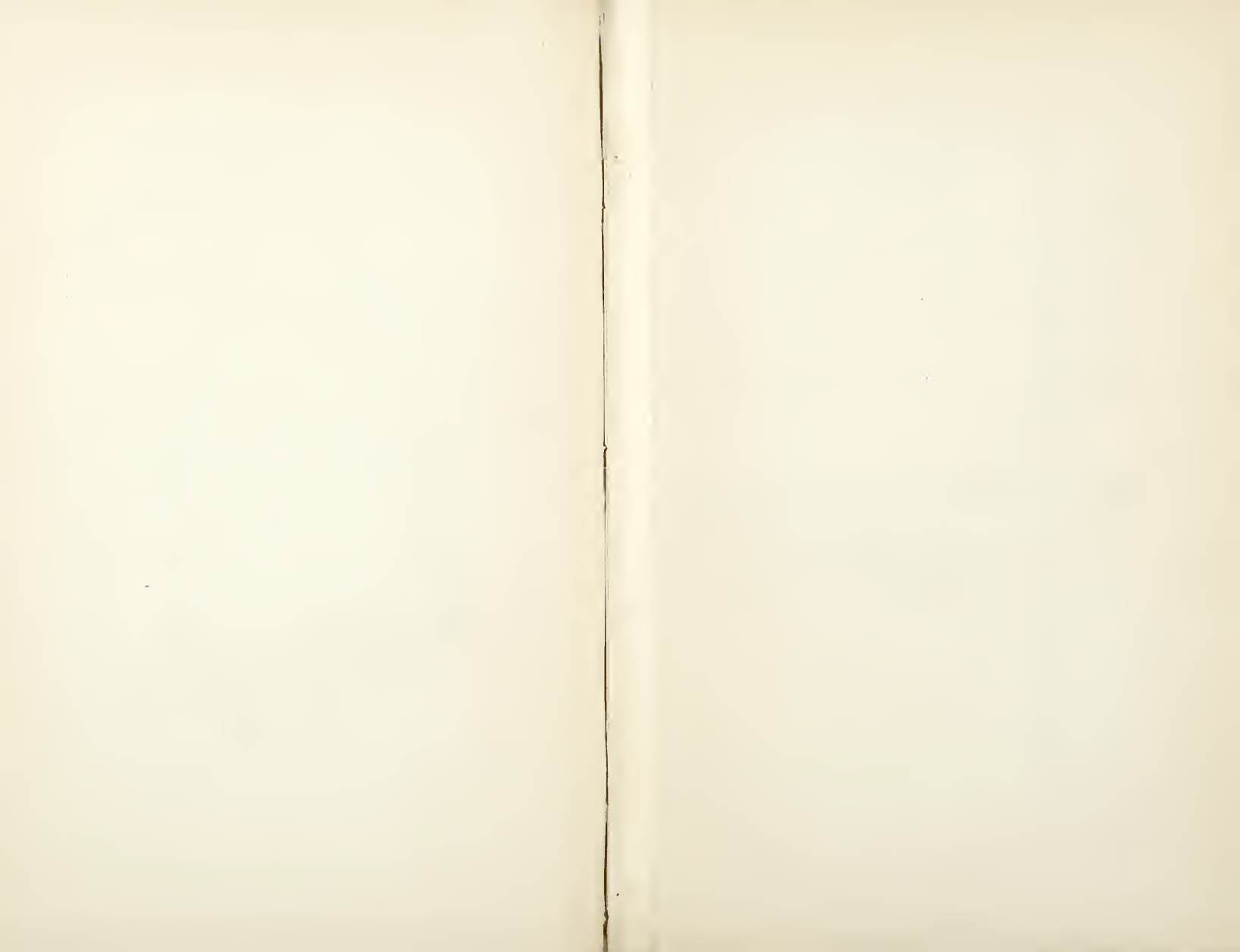
All these points and others render anything like definite information a matter for the moment of decision; nor is there anything to be gained by giving typical dimensions; but a study of Plates XIX., XX., and XXI. will be valuable as showing the results obtaining from the combined efforts of architect and engineer.

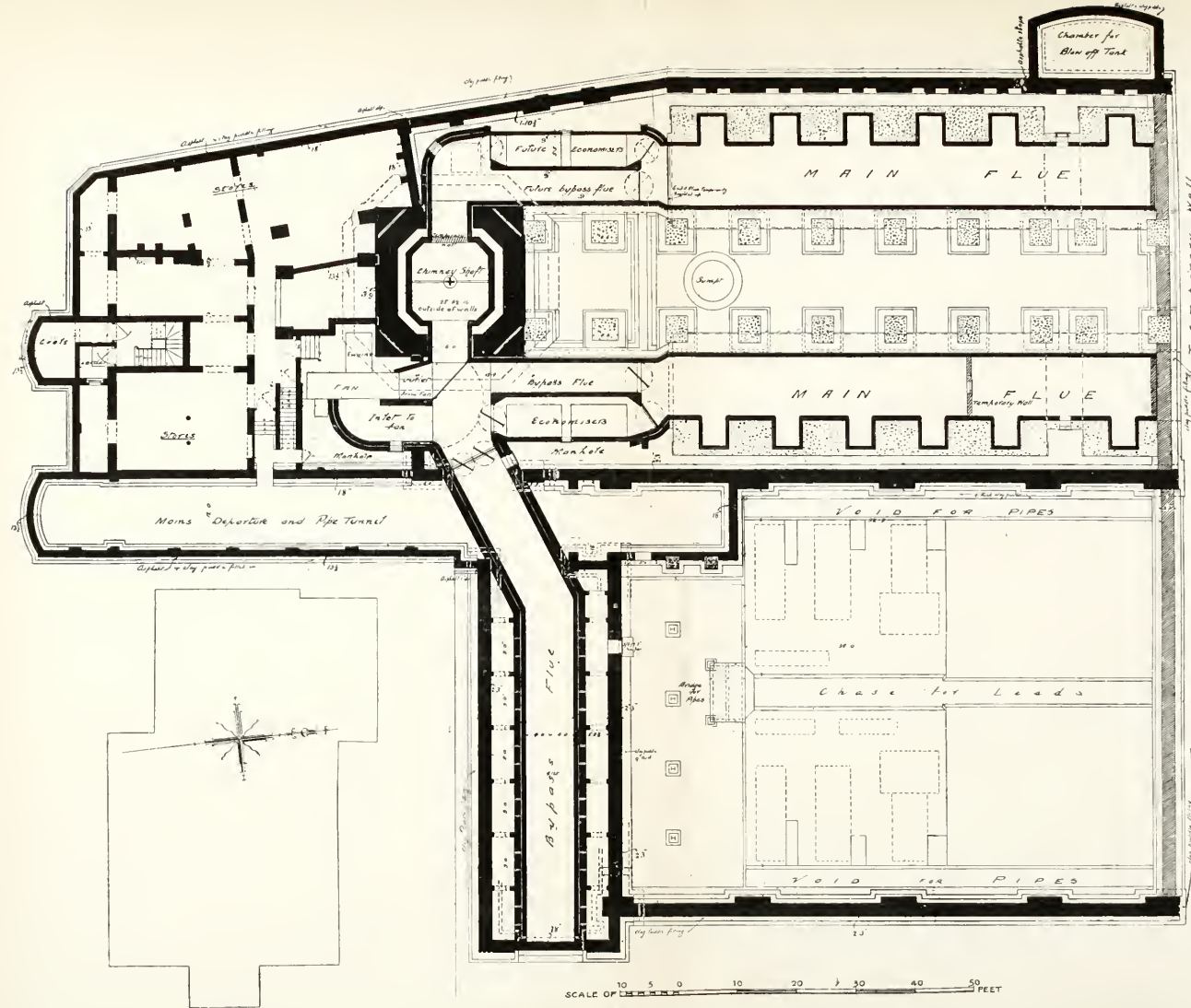
Embassy, etc.—(a.) Spaciousness and stateliness; grouping, prospect, aspect, symmetry.

(b.) As a rule some existing mansion or house is adapted and reserved for the purpose, the requisite accommodation and dignity varying with the importance of the office. A consulate would be merely an ordinary office suite.

Factory.—(a.) Adequate side-lighting, efficient provision of panic exits,* sanitary requirements, avoidance of open staircase-wells.

* See note on page 11.





SCALE OF 0 10 20 30 40 50 FEET
BASEMENT PLAN.

BATTERSEA VESTRY, ELECTRIC GENERATING STATION.

Engineer—A. M. KENNEDY, M.I.C.E.

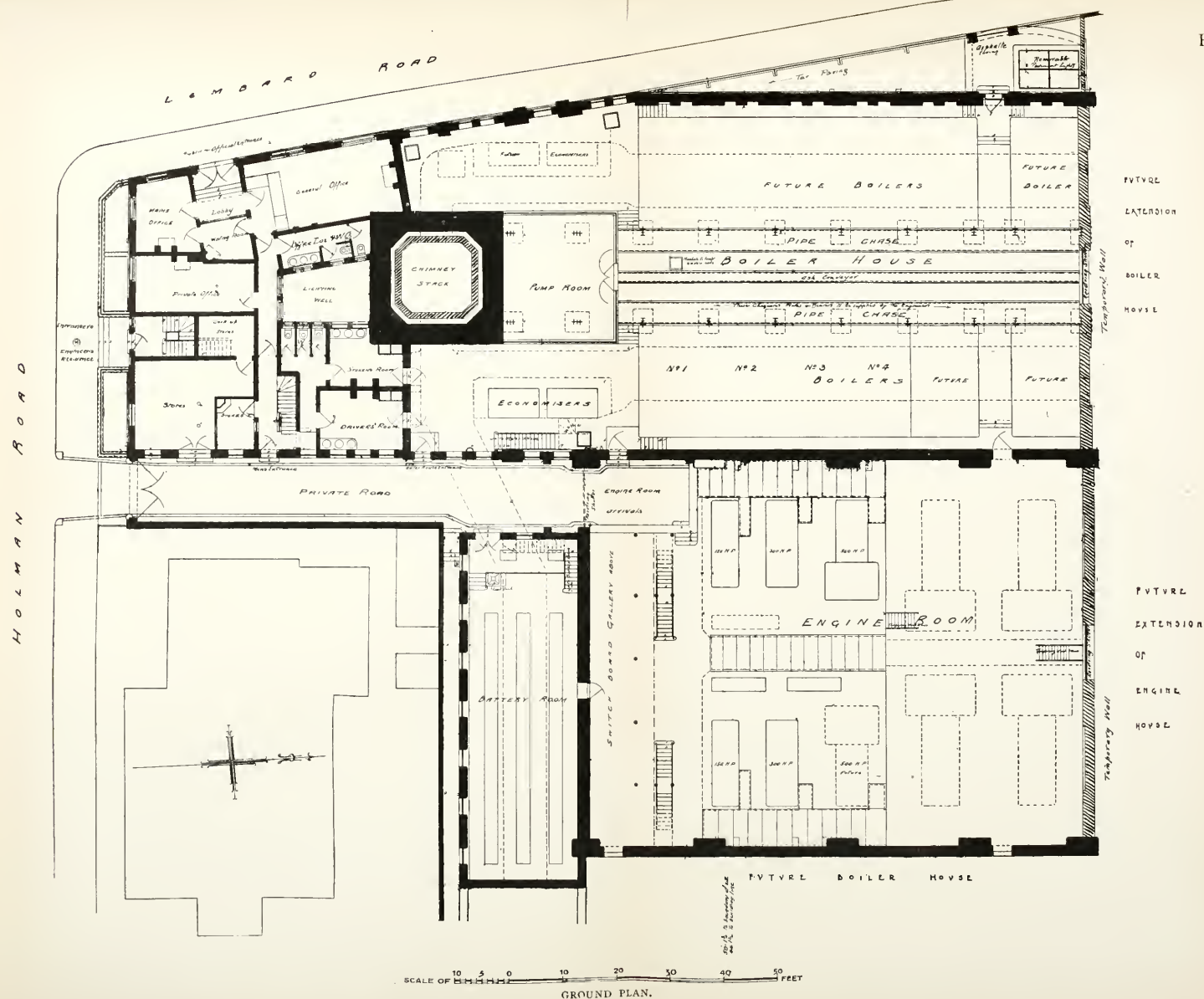
Architect—C. STANLEY PEACH, F.R.I.B.A.

[See also next two plates.]

[Between pp. 30 and 31.]





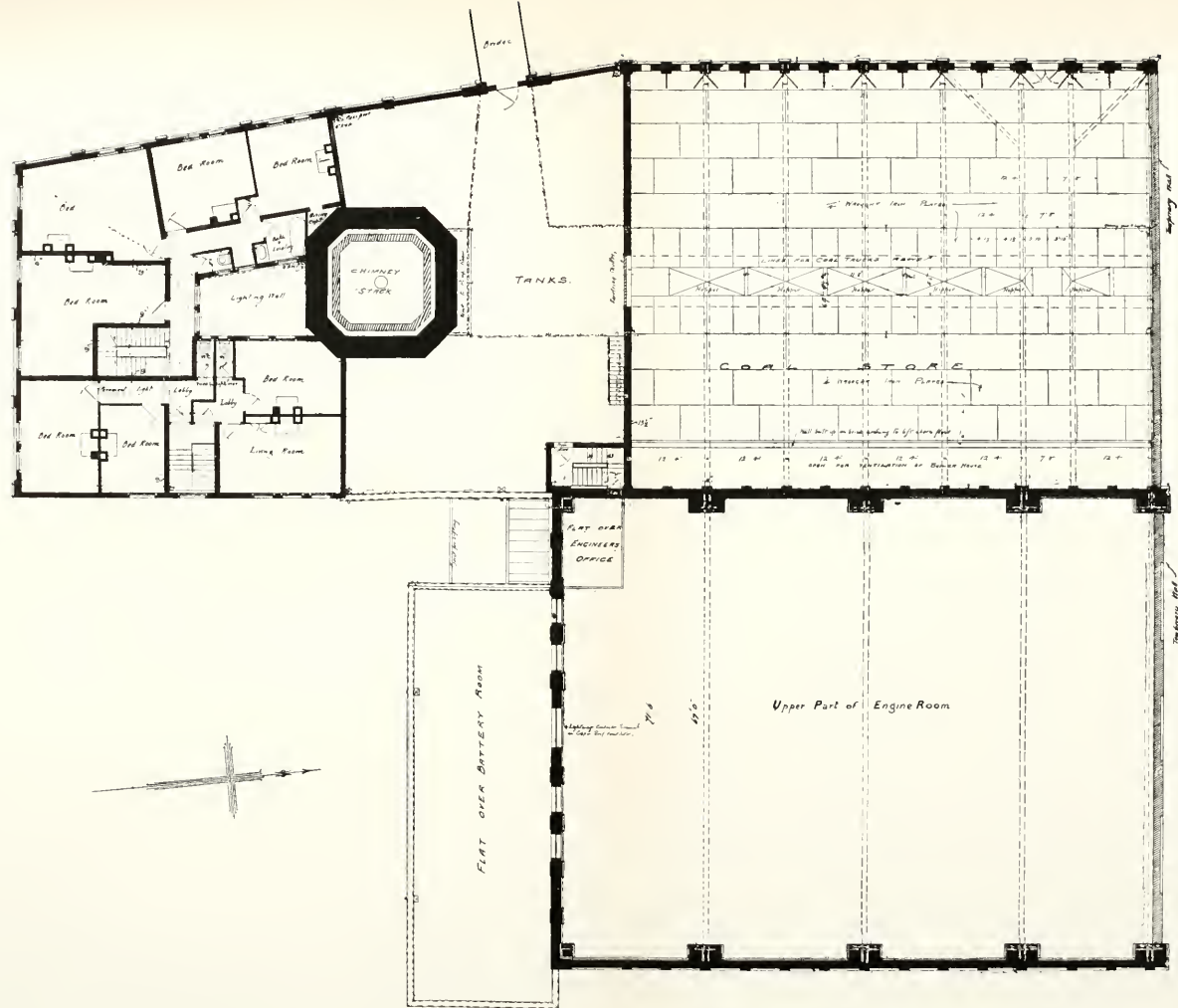


BATTERSEA VESTRY, ELECTRIC GENERATING STATION.

[See also preceding and succeeding plates.]

[Between pp. 30 and 31.]





SCALE OF FEET

FIRST FLOOR PLAN.

BATTERSEA VESTRY, ELECTRIC GENERATING STATION.

[See also two former plates.]

[Between pp. 30 and 31.]

(*b.*) Workrooms varying in size and number with the nature of the manufacture ; stores, W.C.'s, lavatories and cloaks, delivery and packing rooms, manager's room, Office, etc. Perhaps also boiler and engine houses and lifts may be required. In the metropolis, the Hydraulic Power Company provides the requisite power for lifts, etc., on these and other business premises. Electric lifts are also frequently met with.

The Factory Acts impose certain restrictions in regard to these buildings. See extracts given in Appendix F. on page 200 *et seq.*

Fire-brigade Station.—(*a.*) Direct communication with good street, absence of impedimenta in business portions of buildings, good lighting.

(*b.*) Engine-house, stalls for harnessed horses, extra stables, hose-hoist, "escape" storage-space, wagon-sheds, offices, drill-yard, mess-room, recreation-room, look-out tower, stores, boiler-house, workshops, lavatories, etc., drying-closets, wash-house, residential quarters.

The single men in a station are provided with a mess-room and dormitory. The married men have individually a kitchen, scullery, bedroom, and W.C. (this accommodation is inadequate; two bedrooms should be the minimum provision, and a bath-room should be considered indispensable; on the other hand, kitchen and scullery might advantageously be combined, and by this means a living room would be provided where cooking would not take place). An engineer-in-charge has one additional room, and a superintendent-in-charge has further an additional room, a bath-room, and an Office.

An engine-house 27 ft. wide by 34 ft. deep will accommodate two fire-engines side by side, and leave sufficient room as gang-way. The stables are placed immediately behind the engine-

house, and in direct communication. The new system in the metropolis, by which a horsed escape precedes the engine in response to a call, requires the engine-house to be 40 ft. long ; and by increasing the width to 28 ft. 3 in., the positions of the escape and engine are interchangeable. The lower stages of the look-out tower may conveniently have the staircase-well utilised as a hose-hoist for drying the hose.

A watch-tower is no longer a necessity where there is street telephonic communication with the station ; but a hose-tower or hoist is desirable.

A plan of one of the metropolitan stations by Mr Thomas Blashill is given on Plate XXII.

Flats.—(*a.*) Adequate side-lighting, efficient provision for panic exits, sanitary requirements, avoidance of open staircase-wells, furniture requirements, accommodation to suit varied rentals.

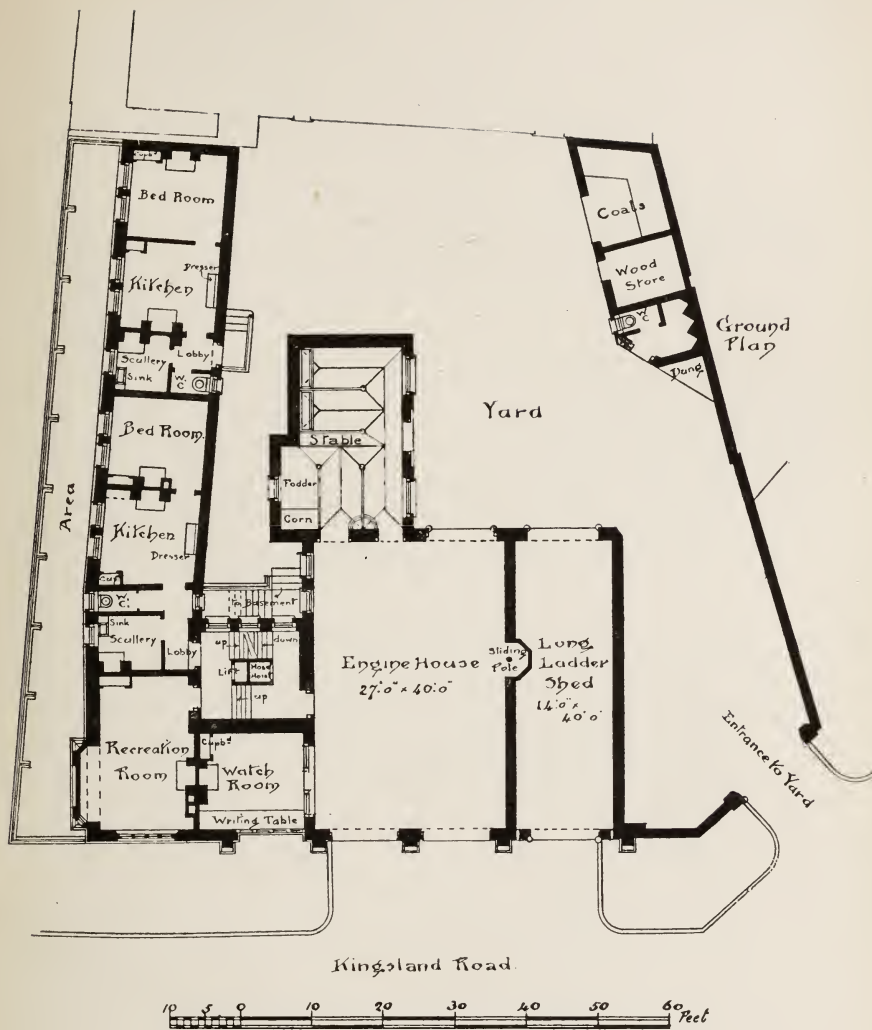
(*b.*) Suites of apartments consisting of sitting-rooms and bedrooms, bath-room and W.C., and frequently kitchen and its offices. Porter's office and private rooms are also necessary, and a lift.

The accommodation required is a very varying quantity ; in some "flats" there is a common cuisine with a staff of domestics for the whole building ; most frequently each tenant has a self-contained flat. Sometimes the accommodation is dispersed over two or three storeys, when the term *maisonette* is used in contradistinction to the *en suite* disposition in a "flat."

Fowl Run.—See Poultry Run under "Outbuildings."

Government Offices.—(*a.*) Good intercommunication of offices, spacious corridors, good lighting, dignity of plan, seclusion of strong rooms, adequate entrances, grouping.

(*b.*) The permanent staff will require in each department :—Rooms for the Chief, his secretaries and their



METROPOLITAN FIRE BRIGADE:

KINGSLAND ROAD (HACKNEY) STATION.

Architect—THOMAS BLASHILL, F.R.I.B.A.

chief secretaries, offices for the differently classed assistants, waiting-rooms, typewriting and telephone offices, lavatories, cloak-rooms, etc., porter's room, strong-rooms, and frequently some special rooms. Besides these there should be a suite of offices for the responsible Minister or State Secretary.

All these requirements are liable to modifications, and it is customary when an occasion arises for planning Government Offices, to receive a schedule of required accommodation and approximate size of offices.

Hall.—See under “Concert Hall” and “Village Hall.”

Hospital and Infirmary.—(*a.*) Central administration, sanitary requirements, aspect, preservation of uninfected zone (for fever hospitals), plenty of window surface, grouping, prospect (for benefit of convalescents), panic exits, classification of patients, extended ground plan, ventilation.

(*b.*) Wards for specified numbers of beds, and distinct for the men, women, and children; separation (or isolation) and small wards; bath-room, bath-space, water and slop closets (preferably approached through cross-ventilated lobby off wards); nurses' duty rooms, nurses' rooms, day-rooms; operating theatre (with anæsthetic and recovery rooms, and railed-off gallery also for students); out-patients' department consisting of waiting-hall, consulting and dark rooms, and dispensary; administrative department containing rooms for matron, steward, physicians and surgeons, nursing and domestic staffs, waiting-rooms, kitchen and offices, stores, laundry establishment; stables and ambulance sheds, mortuary, disinfecting chamber, etc. etc. Frequently a medical school is attached.

A plan of the general disposition of St Bartholomew's Hospital, London, is given in Fig. 6. A similar plan is given

on Plate XXIII. of the Infirmary at Cardiff by Mr Seward, and an enlarged plan of one of the pavilions of the latter is given on Plate XXIV. A Cottage Hospital by Mr E. Carritt is shown on Plate XXV.

Hospitals require varying accommodation according to their

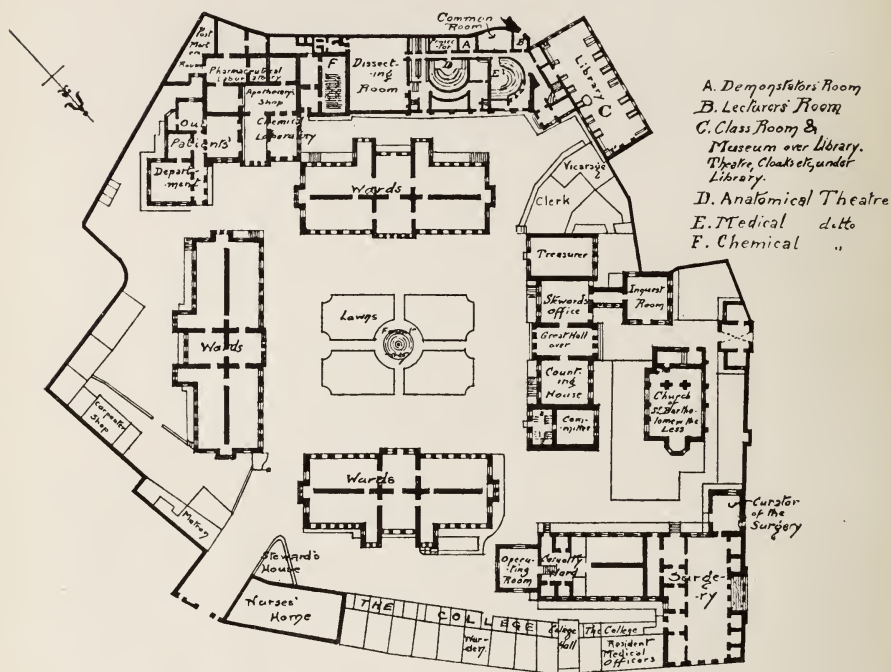
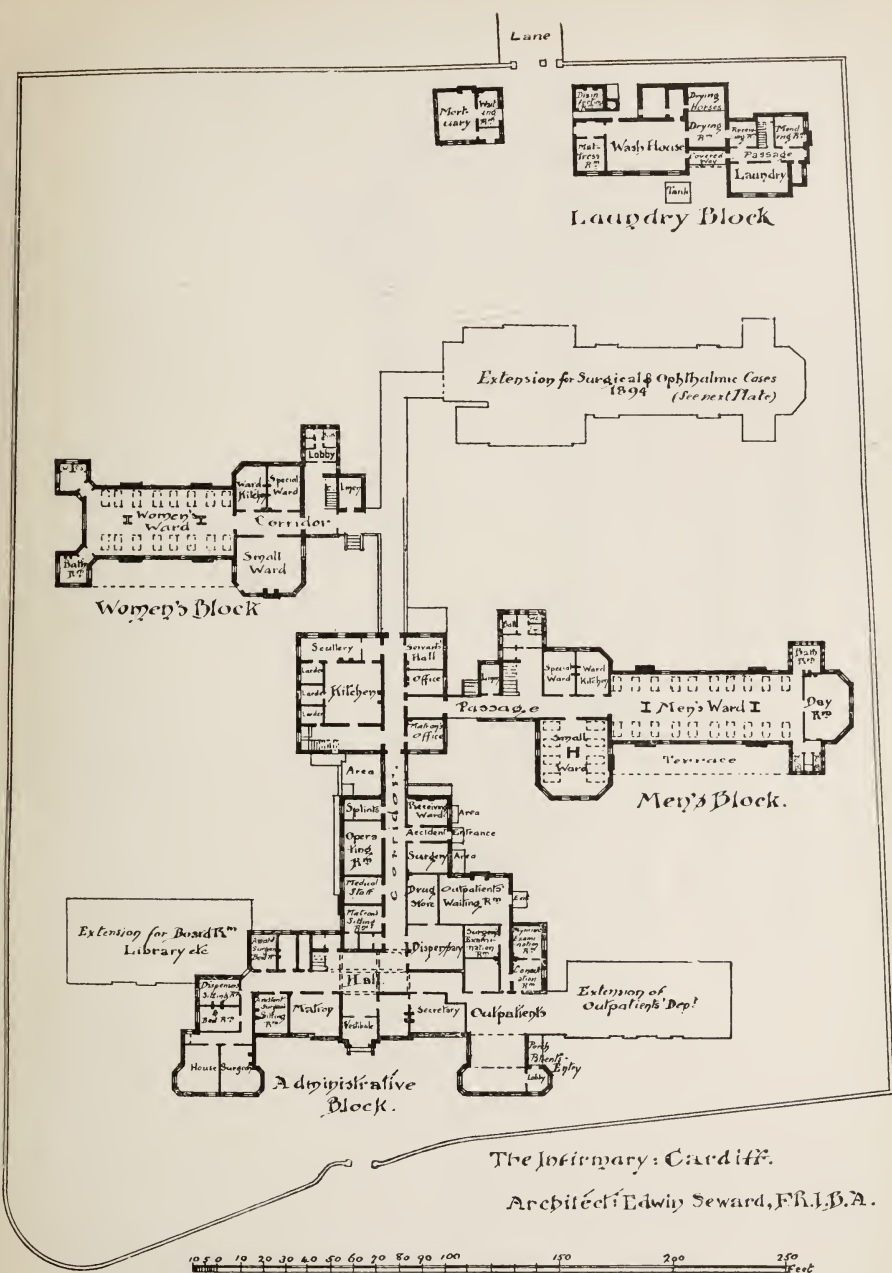


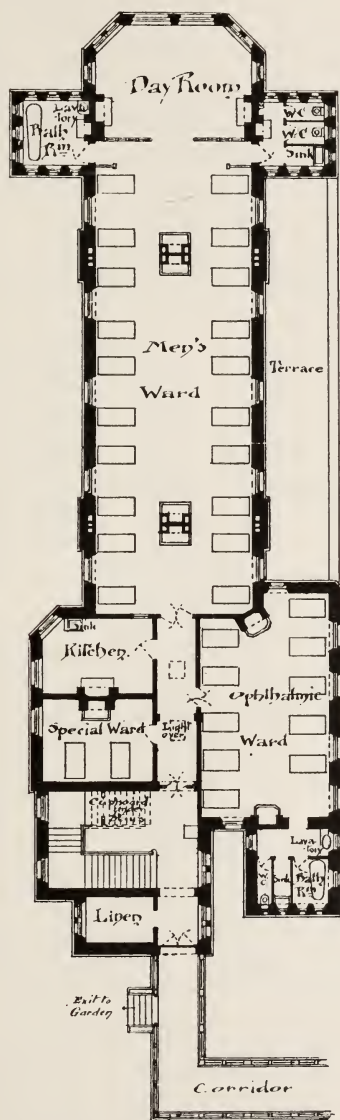
FIG. 6.

specific nature, and selections would be made as requisite from the above schedule. The plan of St Bartholomew's is given as much for the specially quaint features as for other reasons. For a typical general hospital, the one now in course of reconstruction in Gower Street may be cited. The architects of this (the North London or University College Hospital) are Messrs Waterhouse & Son. The specific differences between

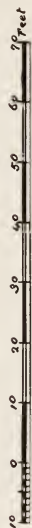


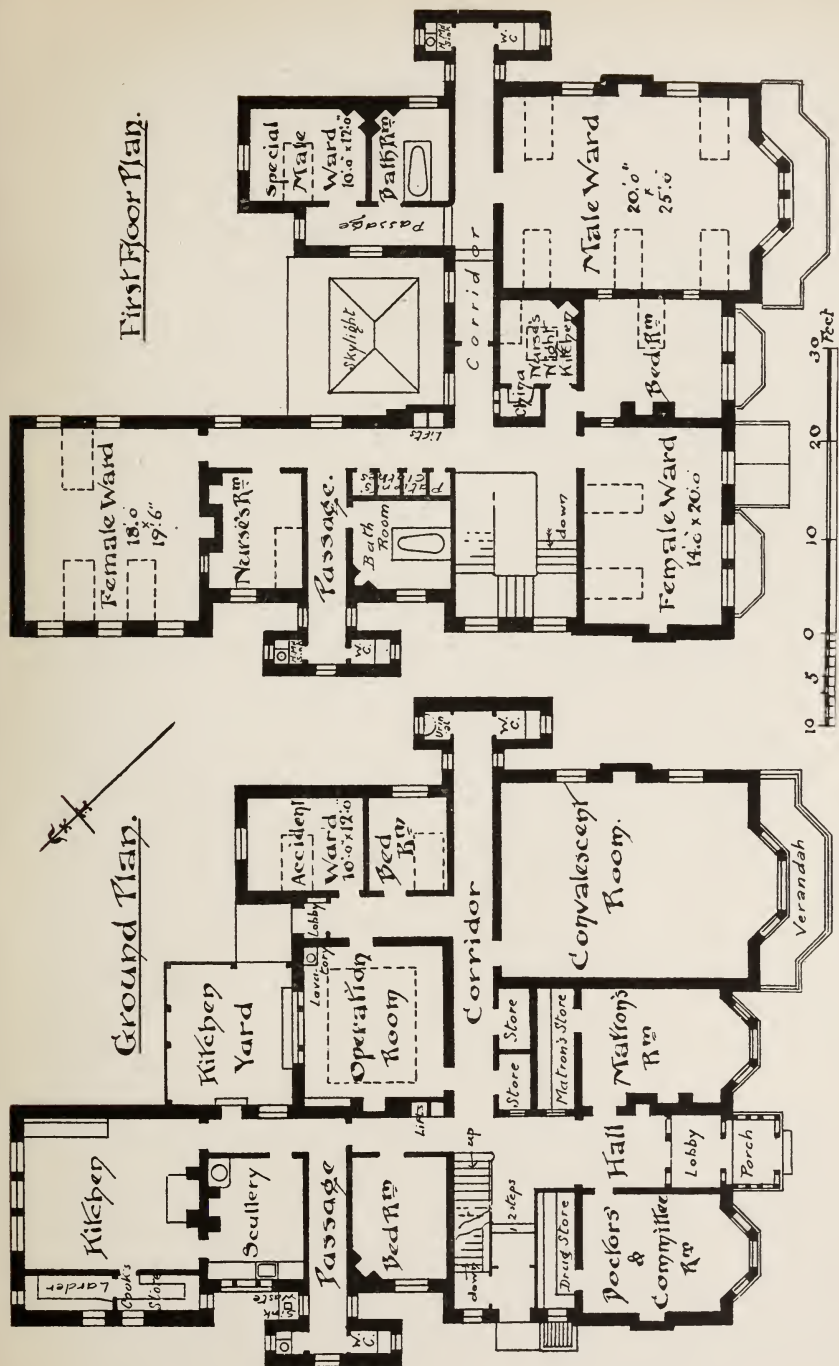
The Infirmary: Cardiff.

See also previous plate.



Surgical & Ophthalmic Block.





COTTAGE HOSPITAL AT SURBITON, SURREY.

Architect—ERNEST CARRITT.

general and isolation hospitals, fever and smallpox hospitals, infirmaries, workhouse infirmaries, and cottage hospitals need not be noted here ; but it is of importance to add the following particulars. If infectious (or isolation) hospitals are the objects of our consideration, the planning is very greatly varied. The pavilion system is now widely recognised, both for general and isolation hospitals, as a very valuable factor in the treatment of patients. The Metropolitan Asylums Board, which is the authority under the Local Government Board for fever hospitals in London, pursues a very steady policy in the matter, though the individuality of the architects employed has plenty of scope. Smallpox is provided for in separate hospitals. In the others the accommodation will provide for scarlet fever, diphtheritic (and enteric) ward pavilions containing large and small wards, duty room, sanitary block, etc., isolation ditto ; receiving and discharging ditto, porter's lodge, medical officer's residence, superintendent's house, administrative offices and block, nurses' homes (separate blocks for day and night nurses), male and female servants' blocks, laundry or laundries, boiler and engine houses, disinfecting and destructor chambers, mortuary, workshops. The administrative block will contain matron's quarters, committee-room, doctor's room, waiting-room, dispensary, stores. Kitchen department, laundry, water storage, etc., are frequently in separate blocks.

The nurses' blocks will provide general mess-room, cubicles (or bedrooms) 8 ft. 6 in. by 13 ft. each, bath-room (one or more), W.C.'s, stores. And of course waiting-rooms for patients' friends are requisite, with robing-room in connection, where the hospital safety wrap is put on and off.

The laundry block should have separate laundries for patients' and for staff linen. It will be natural to work the boiler and engine houses in the same block. A bacteriological laboratory is now being favourably considered as an additional provision.

It is customary for a zone of 100 ft. width to be maintained between boundary wall and infected buildings. The basis of accommodation is that necessary per patient in the ward, and

though there is not a binding maximum, it is safe to take the following as not only the minimum, but also as the generally accepted desirable dimensions. It is a mistake to have excess of space in a hospital ward, as it but renders extra cleaning necessary, and serves (in infectious buildings) to provide more surface for disease germs and particles.

The Local Government Board issues memoranda for the guidance of sanitary authorities with respect to the provision of isolation hospitals; and seeing that schemes for these buildings (amongst many others) have to receive the sanction of this Government Department, a careful study of the pamphlet containing these hints should be accorded. The Board's medical officer takes the following as the desirable standard dimensions :— Not less than 2,000 cubic ft. of air space, 144 super. ft. of floor space, and 12 lineal ft. of wall space per patient in ward. The analysis of wall and floor space is thus :—

	ft.	in.		ft.	in.
Width of bed - -	3	4	Length of bed - -	6	3
Half gangway on each			Distant from wall - -	0	6
side (4 ft. 4 in.) -	8	8	Space reserved at foot -	1	0
			Half clear width of gangway	3	0
			Half width obstructed by		
			stove - - - -	1	3
	12	0		12	0

12 ft. by 12 ft. gives 144 super. ft. The space reserved at the foot of the bed is for a table for medicine, etc. The half width for the stove cannot be disregarded, though perhaps affecting immediately only the central beds, as the gangway would be insufficiently wide at that part if allowance were not made for the stove.

The above calculations will give a ward 24 ft. wide, the length depending on the number of beds to be provided. The side gangways, it will be noticed, are 8 ft. 8 in. wide, and the central one 10 ft. 6 in. (8 ft. 6 in. between bed-tables). Wide gangways are desirable both for sanitary purposes and to give ample scope for the customary clinical courses, where a medical school is attached to the hospital. For wards in general hospitals,

and in children's wards, it is considered that the requisite space per "bed" may be reduced to 100 ft. and 90 ft. super. respectively.

The small wards in a pavilion are desirable for isolating doubtful cases, and for the reception of special patients.

The sanitary block (approached by preference through a cross-ventilated lobby) should contain at least two W.C.'s and a urinal, a bath-room, a slop closet, and standing space for a roller bath. Sometimes a day-room is provided for each ward floor, and this is a commendable arrangement; it should give access to as much sunshine as possible, as the latter possesses valuable healing properties: this room is frequently so treated as to justify and receive the title of the "Sun Room." A space for food trolleys and a linen store are also required for each pavilion. An escape staircase should be provided in connection with each pavilion, preferably at the centre of one of the long side walls.

Workhouse infirmaries require very careful planning, and have to satisfy the requirements of the Local Government Board.

Convalescent Homes form separate establishments for patients, pending their complete restoration to health.

Hotel.—(a.) Adequate lighting, efficient provision of panic exits, sanitary requirements, avoidance of open staircase-wells, furniture requirements, kitchen administration.

(b.) Coffee, commercial, and supper rooms; *salle-à-manger*, private dining-rooms, grand salon, lounge, smoking-room, reading-room, writing-room, billiard-room; reception, music, and ball rooms, and their accessories; private suites, numerous bedrooms, manager's rooms, Offices, stock-rooms, waiting-rooms, cloak-rooms, lavatories, etc., frequently a restaurant, porter's room, telephone, postal, parcels and other offices, kitchen department, rooms for staff.

A selection only from the above will form the accommodation most frequently provided, according to the nature and locality of the hotel. It is of interest to note that the average area of the hotel bedroom is 8 ft. by 12 ft.

Plans of the Westminster Palace Hotel, designed by Messrs Moseley, are given on Plate XXVI., and a more modern hotel is illustrated on Plate XXVII., the work of Mr Henry L. Florence. The x's shown on those plans indicate the position of hydrants. This hotel was originally designed by Mr C. J. Phipps, and on his death, was carried out by Mr Florence on very varied lines.

House.—(a.) Aspect, prospect, privacy, economy of service, furniture requirements, sanitation.

(b.) Reception and business rooms, bed and dressing rooms, bath-rooms, W.C.'s, linen and housekeeper's rooms, kitchen and offices, larders, stores and cellars, dairy, etc. etc.

In planning houses, the fundamental principles always hold good to a greater or less extent ; but for the present purpose, it will be well to take some specific examples—say a seven-roomed, a twelve-roomed, and a sixteen-roomed house. The first would comprise drawing, dining, morning, and four bedrooms, bath-room and two W.C.'s, and kitchen offices. The bath-room, etc., and kitchen, scullery, etc., are (or should be) necessities, and are not customarily included when reckoning the number of rooms.

Though this manual does not profess to deal with the financial aspect of building, it may still be noted that generally considered, basement excavation is more expensive than surface excavation, which is again more expensive than adding another storey to a building. The inference is obvious ; when wishful to deal as economically as possible with a site, it is preferable to build outwards rather than downwards, and upwards rather than outwards.

Reasonable treatment for a seven-roomed house would give such a disposition as this :—

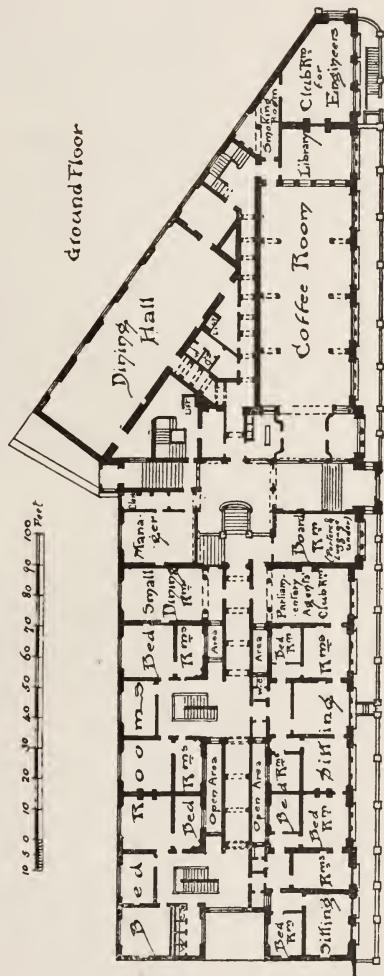
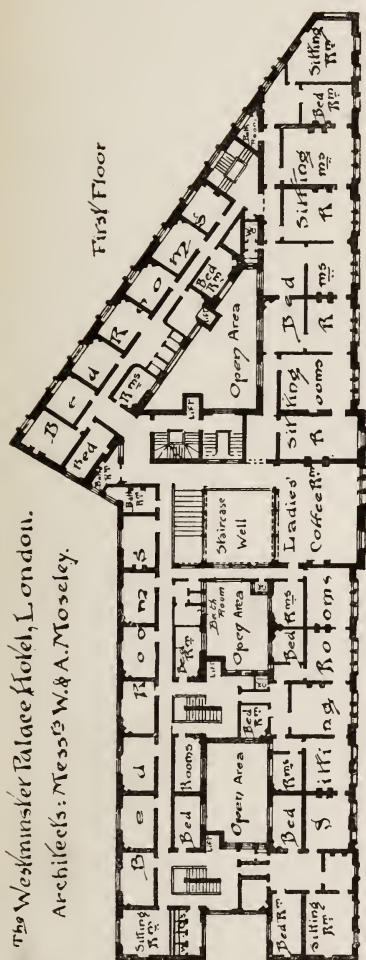
Semi-basement.—Breakfast - room, kitchen, scullery, larder, servants' W.C., and stores.

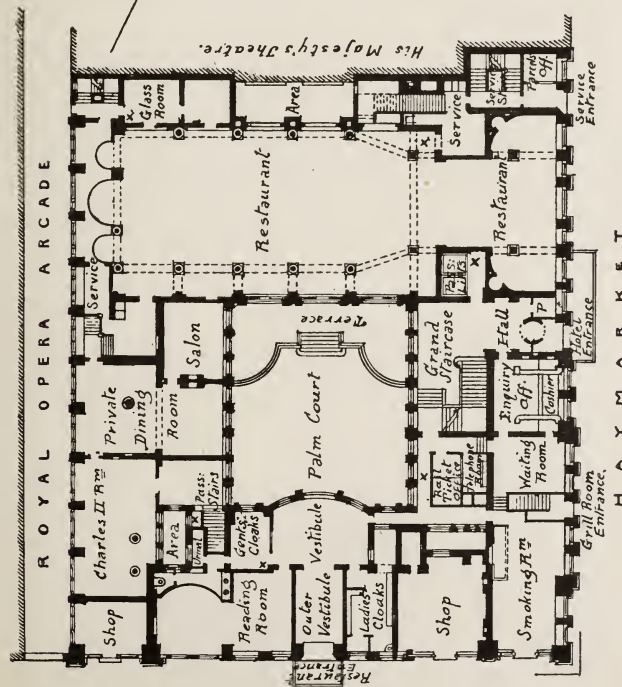
Principal floor.—Drawing and dining rooms.

First floor.—Three bedrooms, bath-room, and W.C.

Attic.—Bedroom.

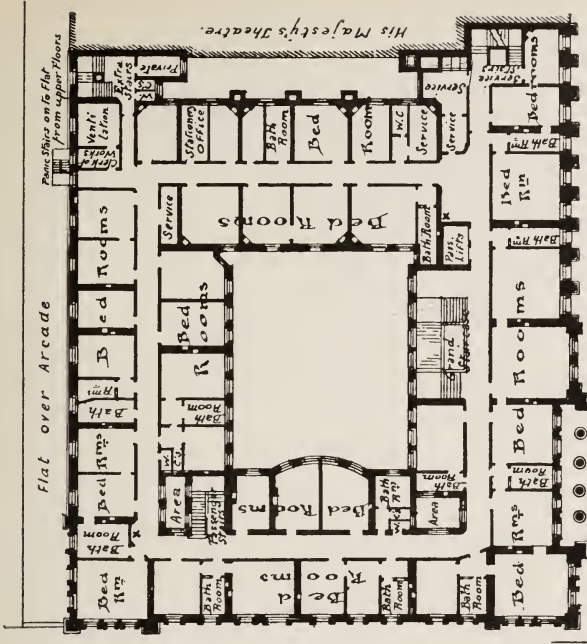
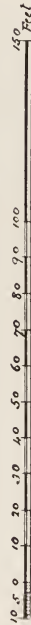
The Westminster Palace Hotel, London.
Architects: Messrs W. & A. Moseley.





Ground Plan

The Carlton Hotel, London.
Architect: H.L. Florence, F.R.S.A.



First Floor Plan

Or, as alternative, it might be thus :—

MAIN BUILDING.

Ground floor.—Breakfast and dining rooms.

First floor.—Drawing-room and bedroom.

Second floor.—Two bedrooms, bath-room, and W.C.

OUTBUILDING.

Ground floor.—Kitchen, scullery, larder, coal-store, and servants' W.C.

Off stair-landing.—One bedroom.

A twelve-roomed house might have as *additional* accommodation to the above, a study and four other rooms (bed and dressing).

A sixteen-roomed house in addition to last might consist of a billiard-room, servants' hall, and two more bedrooms; or one of the rooms might be a gentleman's room (for the occupier to transact his business in), and another might be a boudoir.

The above scheduling may seem somewhat arbitrary, but it is merely intended to give a fair idea of what is frequent in such houses. It is possible that the question often arises in an architect's mind as to the basis—the principle whereon the sizes of rooms have to be calculated. However, it requires but little reflection to recognise that the basis is to adapt each room to its fixtures, fittings, and fitness (perhaps the alliteration will aid as a mnemonic guide). By fixtures is to be understood the necessary windows, doors, fireplaces, etc.; fittings imply the furniture, and fitness refers to the use to which the room is to be devoted.

The following may be taken as the *minimum* sizes of various rooms under *ordinary* conditions :—

Breakfast-room	-	-	-	-	12 ft. by 12 ft.
Dining-room	-	-	-	-	16 ft. by 13 ft.
					(or 14 ft. by 14 ft.)
Drawing-room	-	-	-	-	17 ft. by 16 ft.
					(or thereabouts).
Billiard-room (for a three-quarter table)				-	21 ft. by 18 ft.
Kitchen	-	-	-	-	11 ft. by 10 ft.
Best bedroom	-	-	-	-	13 ft. by 11 ft.
Other bedrooms	-	-	-	-	9 ft. by 8 ft.

The reason why a breakfast-room (even in a small house) is permissibly smaller than the dining-room is of course due to the fact that a householder frequently has guests for the evening meal, whilst merely the members of the household are present at breakfast. As regards the accommodation for a breakfast-room, it would be an improvement were people generally to recognise the advantages accruing from the use of a round table. Consider the minimum dimensions given above, viz., 12 ft. by 12 ft. This gives but a small room, and the fewer salient angles the better under the circumstances. A round table (say) 5 ft. diameter would in practice accommodate as many people as a square one of 5 ft. sides—that is, such a table in such a room would seat comfortably seven or eight people, and leave more room for the fireplace and necessary furniture than would be obtainable with the square table.

It may be considered as an incidental advantage that the use of a round table removes any air of formality that a rectangular one might impart. And sometimes instances occur where householders prefer a round dining-table; and where a house is being planned for such, a square room would look very well. An oblong table in a square room would not look very happy.

In planning a dining-room, if particulars of the requirements are not given or obtainable, an average number of persons should be provided for, proportional to the size and style of the house. It is not possible to give any hard-and-fast ratio, but the architect should not find it difficult to estimate the number. The mode of calculation is similar in nature to that elsewhere detailed under “Schools” for a dining-hall, but the space allowed per individual should in a private house be on a more liberal scale than for a school, for more than one reason:—Firstly, adults are of greater bulk than children; and secondly, the table in a private house is not merely a receptacle for solid food, but should provide opportunity for floral decoration, for which additional space is requisite. School children can dispense with *épergnes* of flowers, dishes of fruit, and two

or three kinds of wine ; a "good square meal" meets their views to perfection, and it is only as years and dyspepsia creep on that the eye requires satisfaction as well as the appetite.

A table 3 ft. 3 in. to 3 ft. 9 in. wide or more is requisite under the circumstances. A width of table 2 ft. per person should be provided, and ample accommodation in the room for service and for furniture is necessary.

Supposing the number to be provided for were fourteen, this would give one each at head and foot of table, and six on either side. The table would then be 16 ft. long by (say) 3 ft. 6 in. wide. Allow 2 ft. gangways and 18 in. for furniture, and a room 26 ft. by 13 ft. 6 in. is obtained. Tabulated it is as shown here :—

	ft.	in.	ft.	in.		ft.	in.
6 times 2 ft. -	12	0			Table, say -	-	3 6
2 „ 2 ft. -	4	0			2 times 18 in. seating	-	3 0
Length of table —			16	0	2 „ 2 ft. gangways	-	4 0
2 times 18 in. seating			3	0	2 „ 18 in. furniture	-	3 0
2 „ 2 ft. gangways			4	0			
2 „ 18 in. furniture			3	0			
Length of room -	26	0			Width of room -	13	6

It will readily be recognised that even in terrace-houses such a room is not infrequent, taking in the whole width of the house and about half the depth.

The fireplace must be borne in mind. At the end of the room would be probably the best place ; for if any one is to be made uncomfortable by the proximity of the fire it should not be one of the guests. The fire-curb or fender would encroach on the 2 ft. gangway, except provision were made to obviate this.

A drawing-room cannot be calculated ordinarily on the basis of either fixtures or fittings. Aspect and Prospect are powerful factors in planning this room, and further mention of these will be made later on ; but 8 ft. to 10 ft. super. per person is a fair allowance in accommodation, inclusive of furniture. The reason why exact calculations cannot be made is, that a drawing-

room has not any definite belongings or limits. There would probably be a piano, but it might be an "upright grand," which takes less room than a "concert grand"; there would be chairs and tables, and possibly cabinets, but it would all be too hazy in detail, unless a client specifically mentions the furniture to be accommodated.

The following notes in regard to a Library, extracted from a paper read very many years ago by Mr John Leighton, are of interest :—"There should be but one external wall, and that north, thus ensuring an even, steady light, without glare of sunshine or heat, which parches and causes the colours to fade. A room on the first floor or above a vaulted chamber is preferable as tending to keep the books dry. Bookcases should not approach too near to the ceiling, where the air is hot and vitiated, tending to destroy leather. The lowest shelves may well project at least 18 in. for folios, thus providing a ledge whereupon to rest these and similar large and bulky works. A gallery is a useful feature in a library. The shelves throughout should by preference be of one width, so that books may be transposed *en masse*, when necessary. Bookcases may be advisedly not more than 4 ft. wide and not deeper than royal 4to on the upper tiers."

A Study requires consideration more from the point of view of aspect and seclusion. A left-hand light to the table is desirable, and a dry aspect should be provided if bookcases are to be placed in the room. An ideal arrangement is to have the window on the left of the student, the fireplace behind him, and the door forward on the right side.

A billiard-room has the table as the basis of calculation. A full-size table is 12 ft. by 6 ft. ; a three-quarter table is 9 ft. long by 4 ft. 6 in. wide. A 6 ft. gangway should be provided surrounding the table, and extra room for spectators and for the fireplace. Thus for a full-size table the minimum size for the room is 24 ft. by 18 ft., though sometimes a width of only 4 ft. 6 in. for gangway is given.

These are the sizes of tables as built :—12 ft. by 6 ft. ; 11 ft.

by 5 ft. 6 in. ; 10 ft. by 5 ft. ; 9 ft. by 4 ft. 6 in. ; 8 ft. by 4 ft. ; 7 ft. by 3 ft. 6 in. ; and 6 ft. by 3 ft.

Bedrooms essentially require to have the furniture taken into account. The following give *ordinary* sizes for sundry articles :—

	ft.	in.	ft.	in.	
Single bed - - -	6	0	by 2	9 to 6 ft.	3 in. by 3 ft. 3 in.
Double bed - - -	6	6	„ 4	6	
Wash-hand stand - - -	2	3	„ 1	3 and upwards.	
Chest of drawers - - -	3	3	„ 1	8	„
Dressing table - - -	3	3	„ 1	9	„
Wardrobe - - -	4	0	„ 1	6	„

Many bedrooms are not supplied so liberally of course, but every such room requires a bed, a wash-hand stand, a chest of drawers, and at least one chair. The fireplace must also be taken into account, and it is well to utilise one of the chimney recesses for a fitment, such as a hanging closet.

As this manual essentially deals with principles and their application, it will be as well to demonstrate why the minimum permissible size for a bedroom has been given as 9 ft. by 8 ft., though it must be noted that this size of room is not recommended for comfort.

The requisite area for a single bed averages	-	-	ft.	in.
„ „ wash-hand stand	-	-	16	6
„ „ chest of drawers	-	-	2	10
„ „ (say) two chairs	-	-	5	5
„ „ fireplace (with hearth)	-	-	3	0
„ „ door space, say	-	-	9	0
„ „ gangway, say	-	-	8	0
	-	-	30	0
			74	9

Therefore 9 ft. by 8 ft. would practically supply these requirements. Smaller bedrooms are, however, sometimes provided, when presumably the 30 ft. of gangway is considerably lessened. It may be noted here, that as the medical profession is apt to ask 1,000 cubic ft. of air space per head in a *living room*, such a *bedroom* as noted above would not be likely to meet with their approval, as it is very unlikely that a height of 13 ft. 6 in. would be

obtainable; and even if it were, people have a curious disinclination to sleep in a cavern; a bedroom 9 ft. by 8 ft. by 13 ft. 6 in. high is too awful to contemplate. This work does not pretend to deal with hygiene, but it might be well to remark that the hygienic requirements are said to be 3,000 cubic ft. of fresh air per hour per individual, and the air of a room may be completely changed three times an hour comfortably. This will explain the reference to an air space of 1,000 ft. mentioned above.

In regard to the area for door-opening, it has been calculated as the width of an ordinary bedroom door (2 ft. 8 in.) by the dimension 3 ft. (which is taken as from centre to centre of

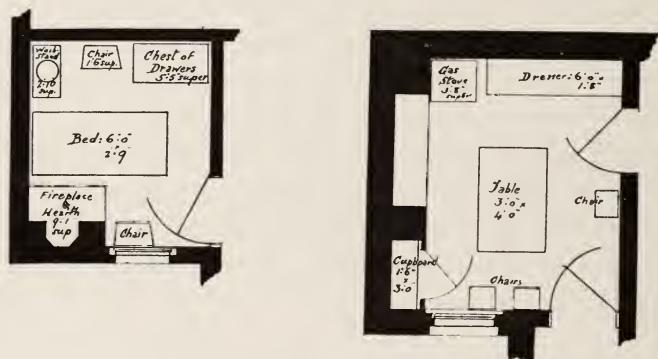


FIG. 7.

architrave); this will give the ground covered by the sweep of the door; it would, however, be fairly permissible to have included this in the provision for gangway.

It is not every architect who considers the furniture when planning a room, and this will account for the frequently crowded results.

One reviewer of this book suggested that calculations based as above would not work in practice, and that on drawing out such a room, the furniture would not fit in feasibly. The accompanying plans (see Fig. 7) will serve to confute this criticism. They have been drawn faithfully from the dimensions given for kitchen and medium-sized bedroom. *Fiat experimentum.*

The minimum size for a kitchen would be demonstrated thus:—

						Super. ft. in.	
Dresser, say, 6 ft. by 1 ft. 8 in.	-	-	-	-	-	10 0	
Table, 4 ft. 6 in. by 3 ft.	-	-	-	-	-	13 6	
Fireplace (with hearth), 8 ft. by 3 ft.	-	-	-	-	-	24 0	
Cupboard, 3 ft. by 1 ft. 6 in.	-	-	-	-	-	4 6	
Two door spaces, each 3 ft. by 2 ft. 10 in.	-	-	-	-	-	17 0	for the two.
Gas stove, allow say	-	-	-	-	-	3 8	
Three chairs, each 1 ft. by 1 ft. 2 in.	-	-	-	-	-	3 6	for the three.
Gangway, say	-	-	-	-	-	35 0	
						111 2	in all.

which a room 11 ft. by 10 ft. will yield. 35 ft. of gangway as above would in practice be 2 ft. 4 in. width of space all round the table, for 2 ft. 4 in. by 15 ft. is equal to 35 ft. super.; this is indeed somewhat restricted for comfort, but is quite workable.

Bath-rooms should provide sufficient room for a bath, a lavatory basin, and the necessary standing space; anything more is waste. The provision of water-closet apparatus in a bath-room, though sometimes met with, and at times requisite from a medical point of view, is otherwise to be deprecated. Bath-rooms are often duplicated, one being provided for the exclusive use of the domestics. In larger houses these rooms are reduplicated for the mutual convenience of hosts and guests. All this may, however, be simplified at the present day, by the introduction of the plunge bath in the various bedrooms; set on pivots, and enclosed in a wood cabinet, and having a flexible but strong “waste,” this arrangement ensures the maximum of luxury, accompanied by the provision of a fresh fitment, admitting of artistic treatment.

A butler’s pantry has to be provided with a sink and cupboard and a table. Frequently (in larger establishments) the butler’s bedroom and pantry are *en suite*, and a plate-safe opens out of the bedroom.

A scullery is usually furnished with a sink or sinks, a copper, and very often also with a small range.

Other rooms do not call for special remarks, but a few words

may fitly be introduced respecting corridors. What is the purpose of a passage? As implied by its name, it is a means of passing from one room to another, and in practice it is intended to supply the means for separate entrance and exit to the several rooms; this object once comfortably attained, any further provision should be minimised.

A good entrance-hall is always desirable, though frequently unattainable, and in larger establishments there will probably be porch, vestibule, entrance and inner halls. In passing it may be noted that a corridor is usually considered as a glorified passage.

There are cases when extra passage-way is a desideratum, *e.g.*, a private service-passage from the kitchen to the dining-room is to be commended. In such an example, as shown in Fig. 8, rapid and private transit is secured, and kitchen odours are not communicated. The objection sometimes urged against the multiplicity of angles is in this instance more academic than practical, and even from the former standpoint does not bear great stress.

The provision of nurseries is confined as a rule to those houses where it is specifically demanded, and this is only natural; as in the case of speculative houses, the speculation is not allowed to extend to the matter of babies who, as unknown quantities, are not deemed worthy of consideration. Two rooms are required for the children—a day-nursery and a night-nursery, and the nurse should have a cubicle or a bedroom close by; there should also be a small spare room adjoining where either of the children suffering from colds or similar childish ailments should be isolated. A scullery, larder and pantry, and domestic offices should also be provided; in fact, the nursery department should be microcosmic. The two nurseries often intercommunicate, but this is not to be recommended, approach more advisedly being to each room separately from a corridor in common.

The planning of a town house differs considerably from that required for the country; that is to say, there are certain factors introduced that necessitate differences. In the first place there is the restriction customarily imposed by the presence of party-walling, thus reducing the freedom of window-provision, which is

such a desirable quality in scientific house-planning. In regard to ground rents, the prior value attached to quantity over quality (relatively not absolutely, be it understood) introduces another factor, by providing a restricted site for the disposal of the rooms; and this is of further application by reason of the narrow frontage too often allotted to the site, from the same economic consideration.

Consequently, the architect in dealing with the typical town house is confronted with the restrictions of limited site, limited frontage and curtailed freedom of lighting. It is not of course contended that detached and semi-detached houses are not of frequent occurrence in towns, but they are not typical.

As a combined result of these restrictions, the "wing" arrangement of plan, providing rooms on either side of the hall or passage, is customarily set aside for the lop-sided plan, where one good front room is provided on the entrance floor, with the hall coursing along its flank, and on the first floor a better room results from the inclusion of the space allotted to the hall below. Smaller rooms in the rear obtain on the different floors; and understood generally the typical town house of the "terrace" class has its rooms disposed thus:—

Floor.	Front.	Rear.	Wing Building in Rear.
Basement -	Breakfast-room and Passage to Coal-cellar and Tradesmen's Entrance.	Kitchen.	Scullery and Offices.
Ground (Entrance)	Dining - room and Hall.	Study (or Library) and Staircase, &c.	Third Room or Cloaks and Lavatory.
First Floor -	Drawing-room.	Bedroom.	Bath-room (or Bedroom).
Second Floor	Bedroom and Dressing-room.	Bedroom.	Bedroom (or Bath-room & W.C.).
Third and other Floors		Bedrooms.	

Where stables are provided, they are usually congregated for a terrace of houses (or for several terraces) within one block of mews in the rear ; for houses of this status, which may be frequently met with, the above table is not sufficiently typical as regards the basement, where more rooms obtain by the provision of a greater depth of site and the introduction of "light" areas ; housekeeper's room, servants' hall, butler's pantry and his bedroom, with kitchen, scullery and offices, form the typical basement plan of such a house, the ground floor providing morning and dining rooms and library (or study), the first floor accom-

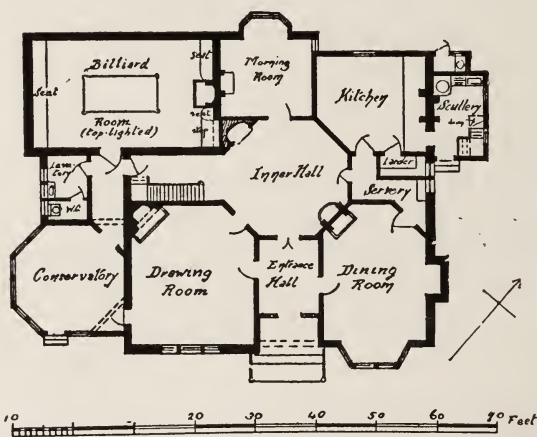
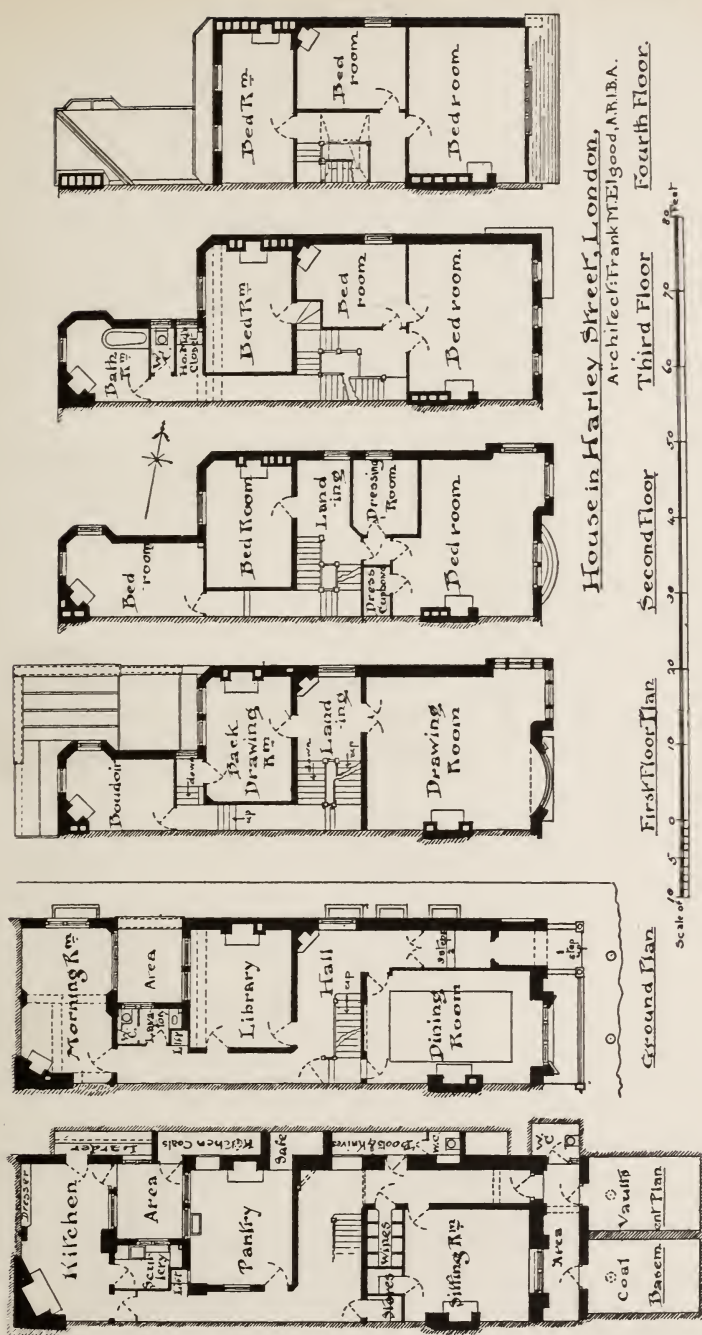


FIG. 8.—DESIGN FOR HOUSE IN SURREY, BY PERCY L. MARKS.

modating the drawing-rooms (front and back), and the bedrooms being above.

It would be impossible and profitless to schedule all the variations of disposition, but the above will sufficiently indicate the customary arrangements.

A few remarks in regard to cellars may conclude the notice of houses. A wine-cellar may by preference be unprovided with brick bins ; portable bins are now obtainable, and they have the advantage of rendering the withdrawing of any one bottle an easy matter ; and moreover, they are a tenant's fixture, so that if the cellar *space* be enclosed, this is all that is necessary in this



House in Harley Street, London.

Architect: Frank M. Elgood, A.R.B.A.

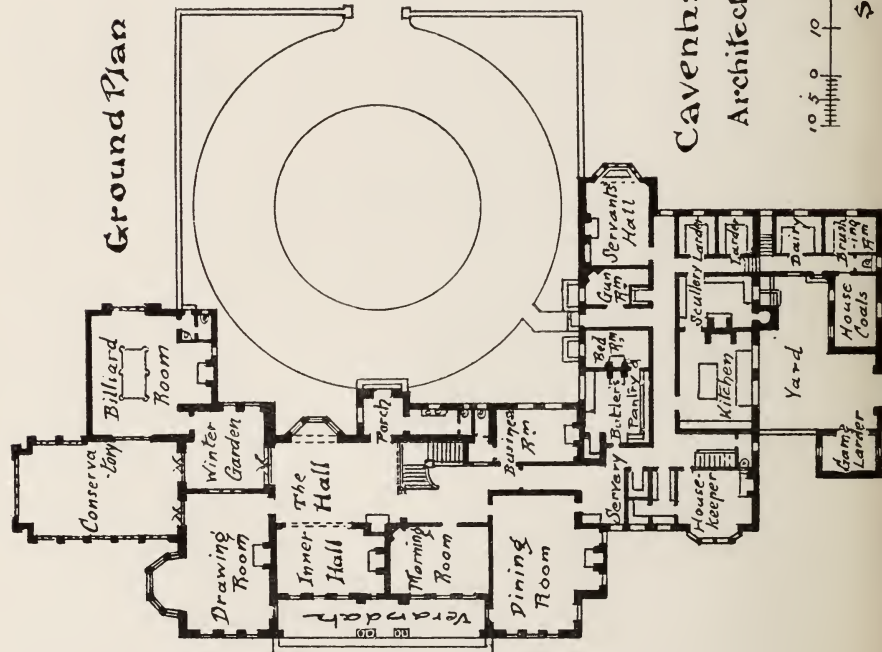
Third Floor

Second Floor

First Floor Plan

Ground Plan

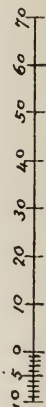
Scale of 1/8" = 1 foot



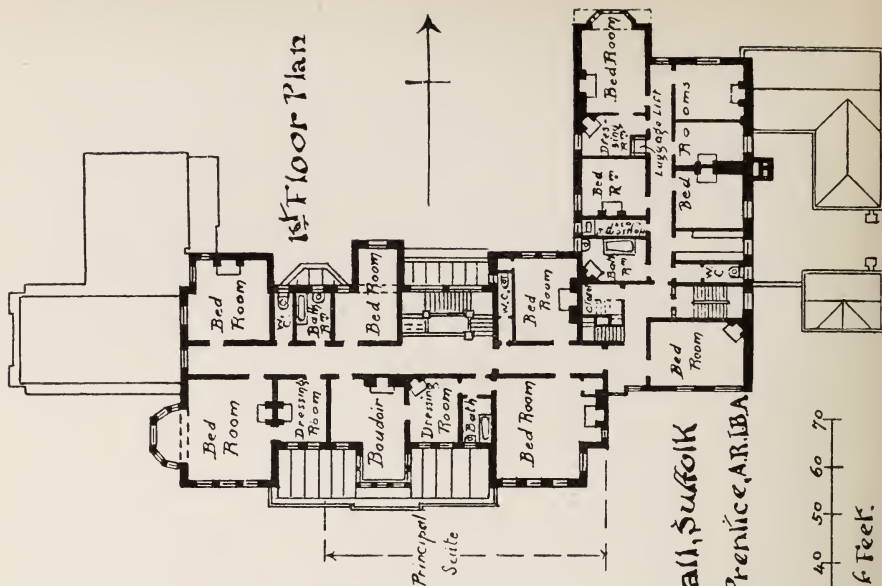
Ground Plan

Cavenham Hall, Suffolk

Architect: A. N. Prenice, A.R.I.B.A.



Scale of Feet:



1st Floor Plan

Principo
Suite

1317 080347

respect, but care has to be exercised that such cellar is not subject to variations of temperature, either as the result of draughts or due to juxtaposition of the kitchen ; but cold cellars should have their temperature regulated by a stove.

A Beer-cellar should be provided with stone shelf or

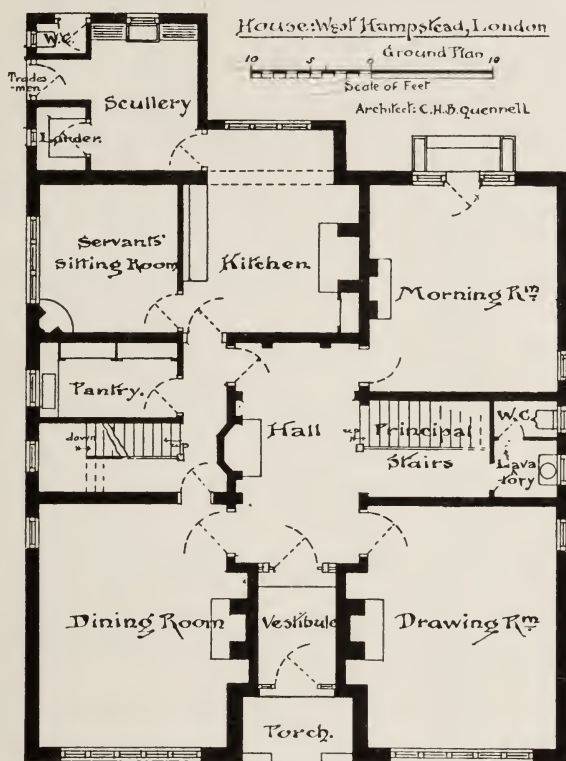


FIG. 9.

shelves, and if below level of delivery-van, needs a skidway, with either a lift or inclined plane for lowering the barrels.

A Coal-store has its size usually calculated on the basis of 45 cubic ft. for every ton of coal required, and only 4 ft. height for the coal should be calculated.

Various plans of houses are given throughout this work to illustrate some one principle or other. Here it will suffice to

give on Plate XXVIII., the plans of a town house designed by Mr F. M. Elgood ; on Plate XXIX. a country house by Mr A. N. Prentice ; on Plates XXX., XXXI., and XXXII., plans of a town mansion by Mr F. B. Wade ; in Fig. 8 a country house by the author ; and in Fig. 9 a town house by Mr C. B. Quennell ; also on Plate XXXIII. the ground plan of a country house of the "initial letter" type. The E-type is of frequent occurrence in early Renaissance work in England, and there is a well-known example of the "I. T." as designed by John Thorpe. There are but few letters of the English alphabet lend themselves readily to practical adoption, but A, E, H, T, and X are most adaptable for symmetrical and workable treatment. There are one or two obvious criticisms to which the plan on Plate XXXIII. is open ; but though obvious, they are of minor importance. Various rooms, such as steward's, still-room, gun-room, etc., and sundry outbuildings have not been dealt with, as they are not an every-day provision, but these and others form at times a component part of large houses.

Infirmary.—This is dealt with under the heading of "Hospital."

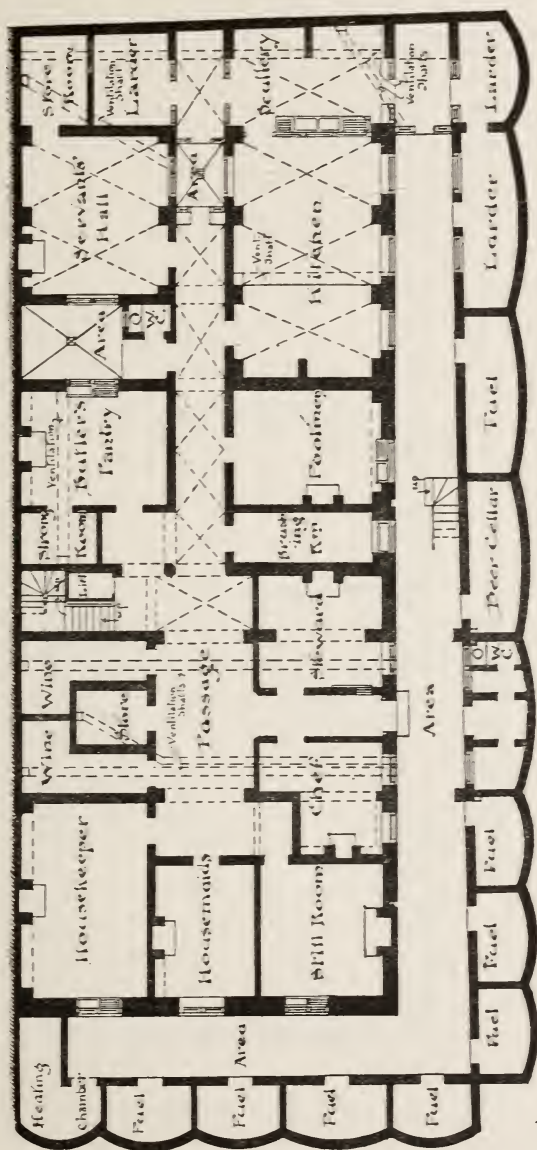
Kennels.—See Dog-kennels under "Outbuildings."

Kursaal.—(*a.*) Plenty of light and space, rooms for recreative purposes of varied kinds.

(*b.*) Concert-hall ; reading, smoking, and refreshment rooms ; (sometimes) a billiard-saloon ; dining-saloon ; cuisine department ; artistes' rooms, offices, lavatories, etc.

Law Courts.—(*a.*) As for Assize Courts.

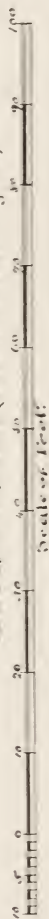
(*b.*) The accommodation is not very different from that required in "Assize Courts" (*q.v.*). In the metropolitan Courts, however, are numerous rooms for the hearing of arbitration and Masters' cases ; whilst as a partial set-off in London the barristers robe and dis-

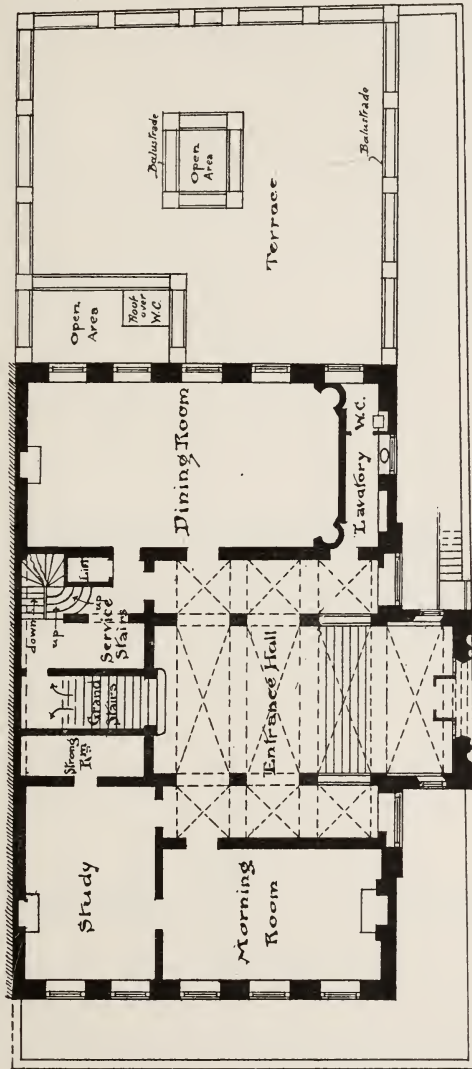


House in London for Lord Windsor, J.C.

Architect: Fairbairn & Wade, F.R.S.B.A.

Basement Plan. (See also the two following Plates)

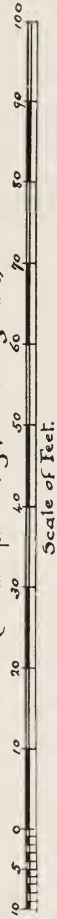


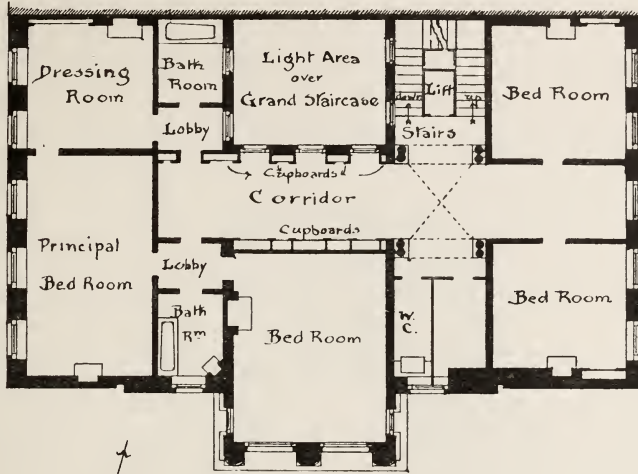


House in London for Lord Windsor.

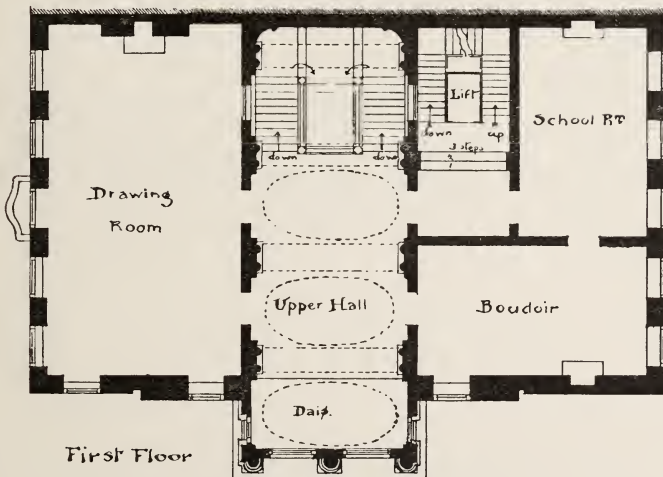
Ground Floor Plan

(See also preceding & succeeding Plates)





Second Floor.

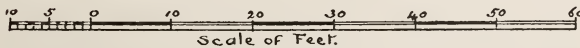


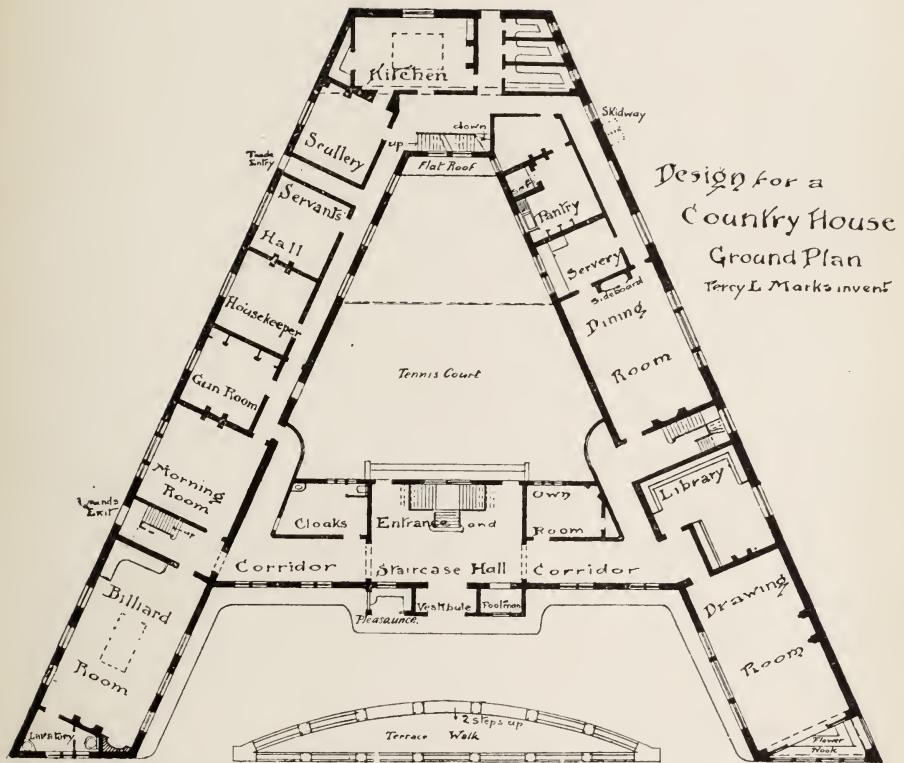
First Floor

House in London for Lord Windsor.

Architect: F.B. Wade, F.R.I.B.A.

(See also the two preceding Plates).





Design for a
Country House
Ground Plan
Terry L. Marks invent

10 20 30 40 50 60 70 80 90 100 Feet

robe in their own chambers, nor is there any necessity for a refreshment-room in the London Courts.

Library and Reading-room.—(a.) Ample accommodation for public and for books, etc.; good lighting; efficient supervision of public portion.

(b.) The accommodation for free public libraries (central establishments) would be lending and reference departments (with ample storage for books), news-room, magazine-room (this may well be combined with the reference-room), librarian's office, sometimes a ladies' reading-room, and sometimes also a children's room. W.C.'s, etc., should be (but are frequently not) provided. Librarian's residence, consisting of a couple of living rooms, three bedrooms, kitchen, etc.

Branch buildings of such libraries would be schemed on a less generous scale both as regards accommodation and size. There would be lending and reference and news-rooms, and a sub-librarian's office, book-storage, and caretaker's rooms. W.C.'s, etc., should be provided. The basis of accommodation is as follows:—In the news-room, at a table the space per reader, and at a reading stand the requisite space for an open newspaper; the provision of gangways is also to be reckoned with, and should be on a generous scale. In calculating the space per reader at the table, adequate allowance is to be made for the average requirements in accommodation of a journal; 2 ft. 6 in. width and 2 ft. depth of table per reader is not excessive, and the depth of seating clear of the table should be 2 ft.

In the magazine-room the space per reader may be less than in the news-room; 2 ft. by 2 ft. of table would suffice.

In many reading-rooms (or libraries as they are usually called) the planning shows a succession of bays with a double table in each, and this is a very good arrangement, as it gives greater quiet and seclusion for careful study; central tables are also provided along the nave. These bays secure additional

shelvage for books under very economical conditions. Bookshelves should be not less than 10 in. deep. A good example of this treatment occurs at the Guildhall Library in London by Sir Horace Jones (see Fig. 10), where it is further improved by the introduction of a triforium gallery with shelvage for books, with the returns of bays carried up.

The principal reading-room in the British Museum provides very comfortable and complete reading spaces. The width per reader is 4 ft. 2 in. and the depth 2 ft., and this space provides a reading-stand and a shelf for books (both of which are hinged to the back of the desk, and can be laid in flush to be out of the

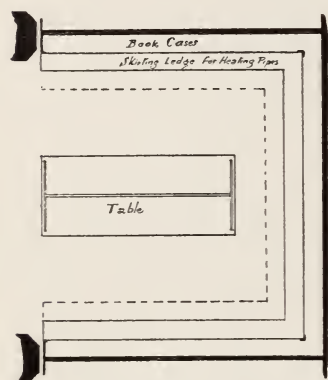


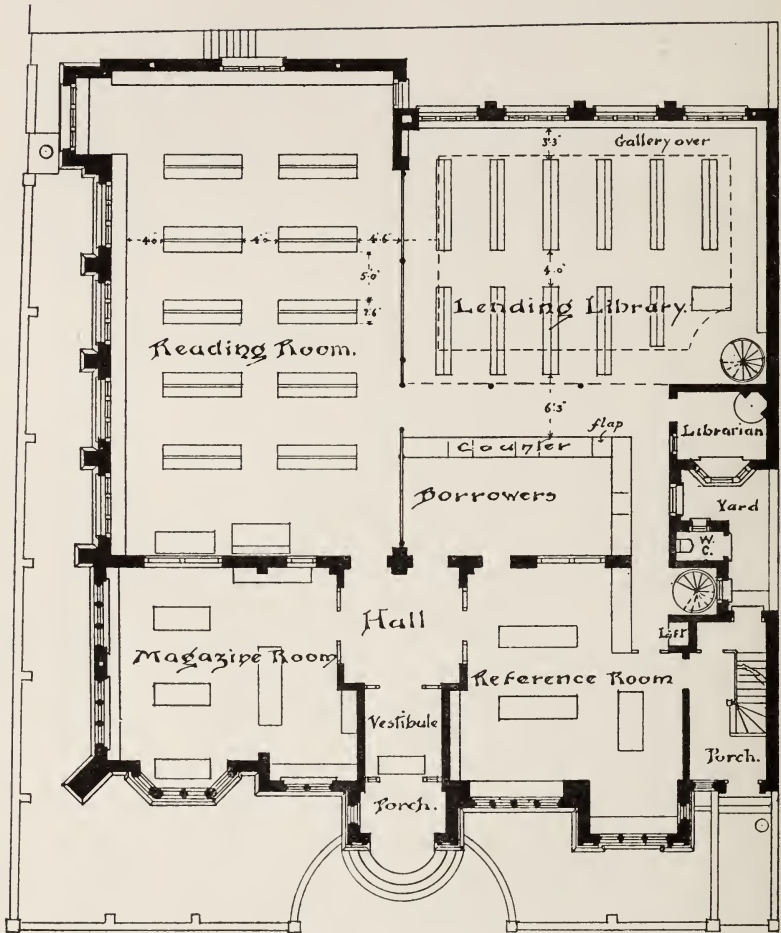
FIG. 10.—READING BAY IN THE GUILDHALL LIBRARY.

way when not required to be used), a pen-rack, ink-stand, hat-rack, paper-weight, paper-knife, and blotting-pad; it is only the last three items that encroach on the desk, and not to any serious degree even then.

A remark may be not *mal-à-propos* here with regard to the pernicious habit (or perhaps “practice” is the correct phrasing) of using sham-book doors; there is not any excuse even on the

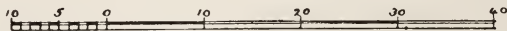
score of symmetry, for the latter is more admirable when unshackled by the bonds of monotony. The British Museum is a bad sinner (and seemingly unrepentant) in this respect; its books number over two millions, and though this may not be considerable, yet it is sufficient to render such a pretentious provision uncalled for; it is true that the library shelves were designed when there was a smaller number of books, but it makes very little difference. The late Sydney Smirke was architect of this block, and it is probable that he had to submit to the realisation of ideas quite foreign to his own wishes.

The notes entered on an earlier page bearing on libraries in private houses have but very slight (if any) application here,



The Passmore Edwards Public Library, Acton.

Architect: Maurice B. Adams, F.R.I.B.A.



the conditions and requirements in private and public libraries being so very different.

A plan of the Acton Free Public Library, Middlesex, by Mr Maurice B. Adams, is given on Plate XXXIV.

Lunatic Asylum.—(*a.*) Central administration, sanitary requirements, classification of inmates, aspect, grouping, adequate lighting, prospect, panic requirements.

(*b.*) Receiving, waiting, and discharging rooms; doctors', matron's, superintendent's (probably a doctor), and steward's rooms; dispensary, bedrooms, staff cubicles; patients' day and night wards, dining and recreation halls, bath-rooms, lavatories, W.C.'s, etc.; chapel, infirmary, padded rooms, private rooms for patients, isolation hospital, mortuary; staff, mess, and recreation rooms; kitchen, laundry, and heating departments, workshops, bakery, stores, porter's lodge, etc. etc.

The pavilion system of planning is an excellent one, and with the administrative department centrally placed, and male and female departments right and left of same, the best results are obtained.

Private rooms should be provided for paying patients.

Lunatic asylums should be planned with every regard to the provision of ample sunshine, light, air, and ventilation, and cheerful prospects.

The basis of accommodation is similar to the requirements for infirmary inmates (*q.v.*), and a special provision in these buildings is that there should be ample security against the escape of any patient, the best means being an unscalable boundary wall, and only one entrance on to the property.

It has just been noted that there should be ample supply of sunshine and light, but it is at the same time possible that some cases of insanity would be benefited by a restricted subjection to the sun's influence. Violent cases of mania, for example,

would be by some doctors recommended for such treatment. One of these medical gentlemen who had charge of an asylum, carried out this principle to the utmost. Certain rooms were decorated with blue wall-hangings, others with bright red, and others with green, and so on. It was considered that violent patients, on being confined in rooms decorated in blue, would gradually get "the blues," which phrase is habitually used to give the impression of total lack of excitement on the part of any one suffering from such an attack. Victims of melancholy madness would be housed in rooms decorated in bright red, evidently with the intention that their mood should be changed to one which would incline them to start out and "paint the town red." The green-decorated rooms would be for imbeciles and lunatics generally, as the effect of this colour is restful. This system, it will be seen, is not in any way accordant with Hahnemann's Homeopathy, which has so much to recommend it for ordinary purposes, and though the above scheme sounds very plausible, it is the medical and not the architectural profession must decide on its merits or demerits.*

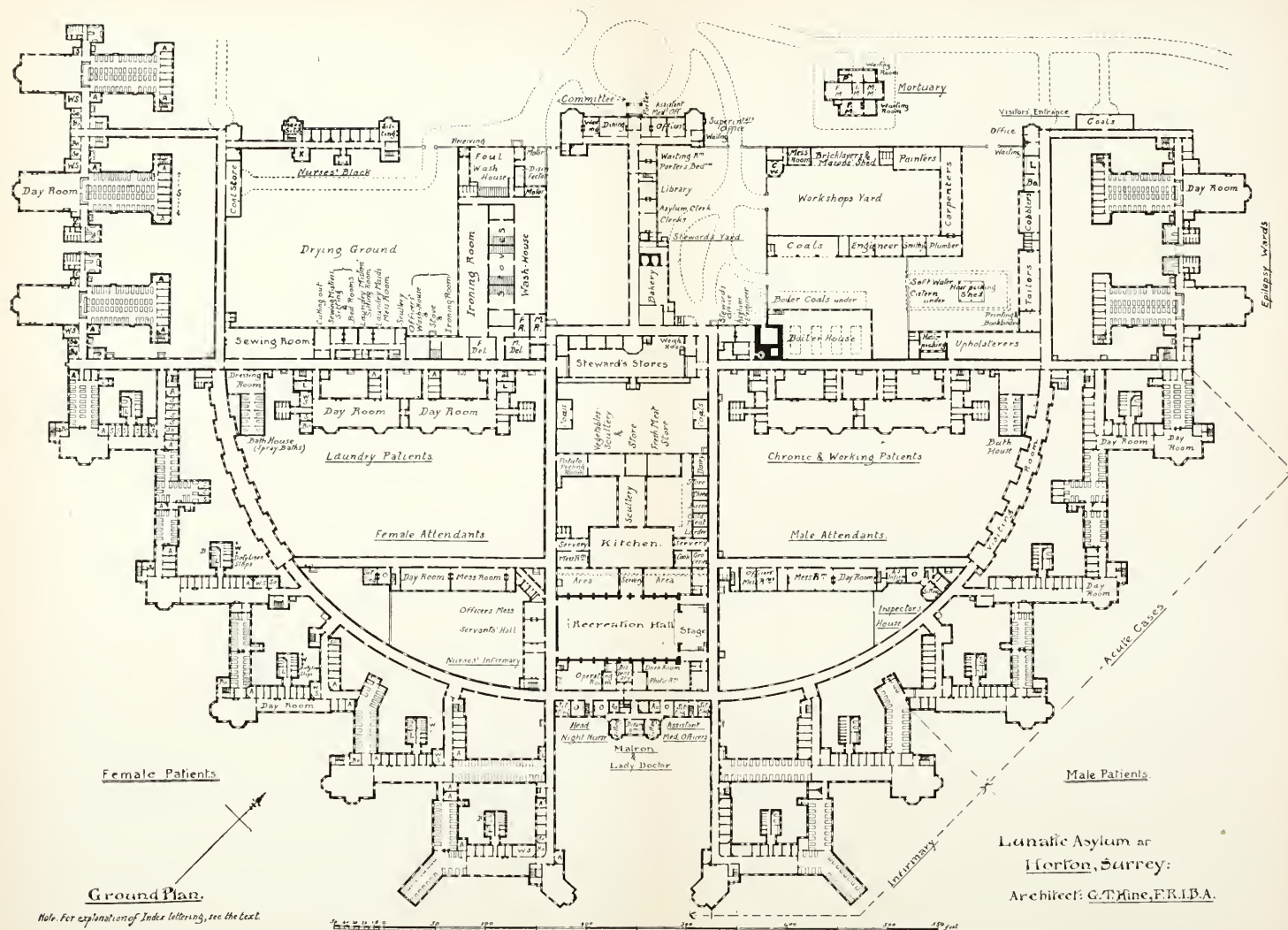
For plan of lunatic asylum see Plate XXXV., which gives a design by Mr G. T. Hine, and it is of interest to note that the Bexley Heath Asylum is a replica of the one at Horton.

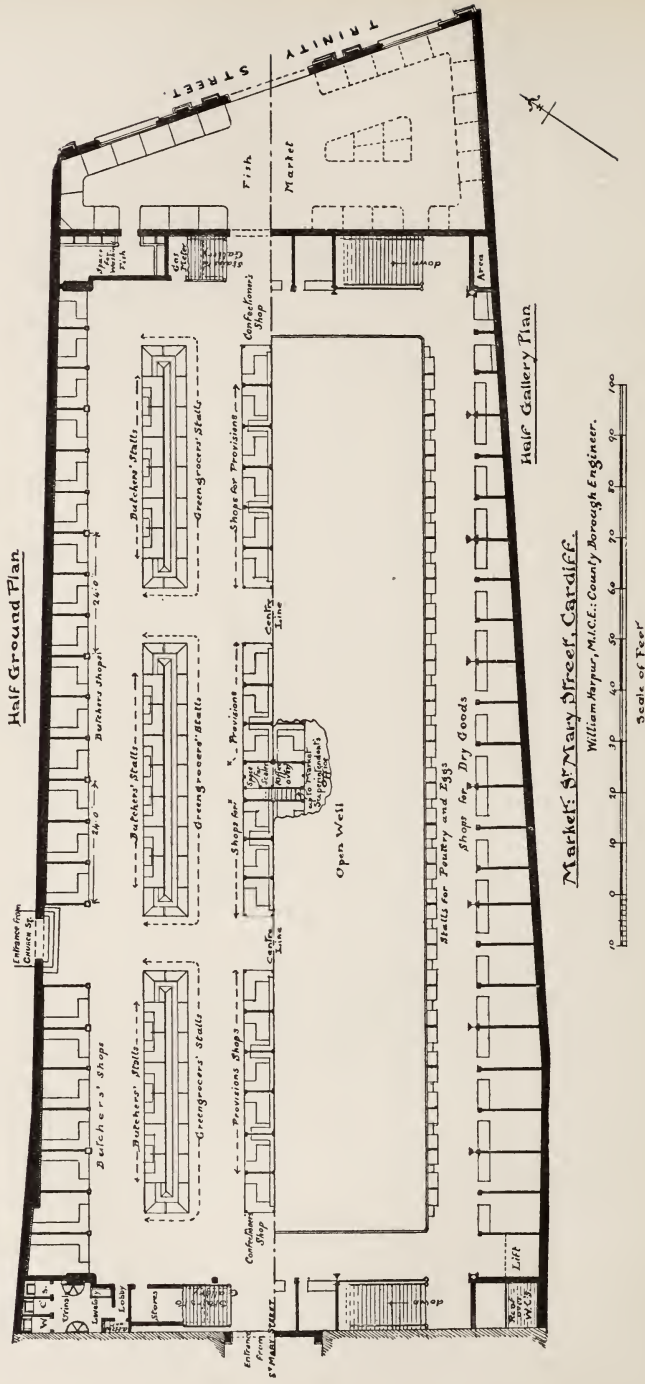
The following are the references for initial letters on the Asylum plan :—

A. Attendant.	L. Lavatory.
Aa. Area.	M. Del. Male Delivery Room.
B. Bath.	M.M. Male Mortuary.
Bo. Boots.	M.R. Male Receiving-room.
C. Coals.	O. Office.
C.W. Clerk of Works.	P. Porter.
F. Del. Female Delivery Room.	P.M. Private Mortuary.
F.M. Female Mortuary.	S. Single Bed Ward.
F.R. Female Receiving-room.	So. Store.
I.M. Inspection Mortuary.	W. Water-closet.
K. Kitchen.	W.S. Ward Scullery.

* The hospital for the insane at Alessandria in Italy has introduced this system of treatment.







Market at St. Mary Street, Cardiff.

William Harpur, M.I.C.E.: County Borough Engineer.

Market.—(*a.*) Numerous in preference to spacious stalls; good roadways; efficient accommodation for public and for market goods; good lighting.

(*b.*) Market-hall (divided into stalls, and having efficient gangways and roadways); public weighing machines, superintendent's offices, covered accommodation for carts, cellars, ice-houses, lairages, and pens for the animals, space for offal, lavatories, etc.

The specific accommodation required in a market building depends naturally on the nature of the goods to be disposed of. It will be simplifying matters for the purposes of this work to make notes of a provincial general market. There would be stalls for the sale of meat, fish, poultry, dairy produce, vegetables, fruit, flowers, hardware and crockery, drapery, toys, etc. Meat and fish stalls are by preference to be disposed along the outer perimeter of the building, the central portion thus being reserved for goods less likely to damage the dresses of the public. In connection with the meat shops and fish stalls there should be refrigerating chambers; these shops would be the size of small shops, so that marketers could walk within and select their purchases more comfortably. 12 ft. by 12 ft. is a good size. Other stalls may reasonably be disposed in double rows, rendering it easy to convert two into one, if any tenant requires additional space. By this means, even if double rent has to be paid, there is greater economy of service for the stallholder than by renting two separated stalls, and there is of course the benefit of facing two avenues; one large stall is also more effective than two small ones. Each stall has thus a minimum area of 6 ft. by 6 ft.

The following specimen dimensions may be of interest:—

The width of cart avenues in Sheffield Market = 27 ft.

The width of cart avenues in Smithfield (London) Poultry Market = 21 ft. 6 in.

The size of stalls in Wakefield Market is 10 ft. by 3 ft. 6 in.

Live animal markets require lairages and pens for the

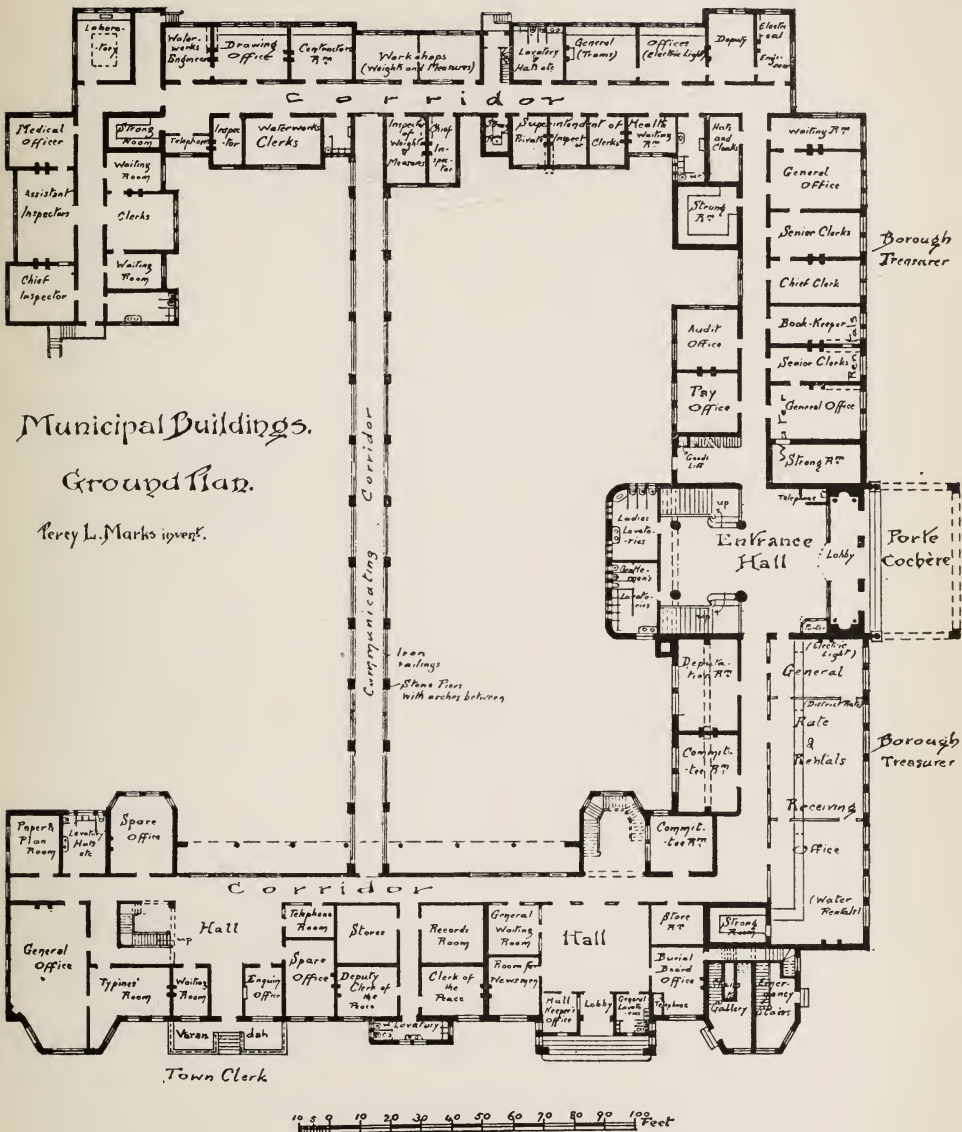
animals as their special features. Abattoirs are sometimes met with in this connection also, and the action of public bodies in providing these is gradually coming into favour.

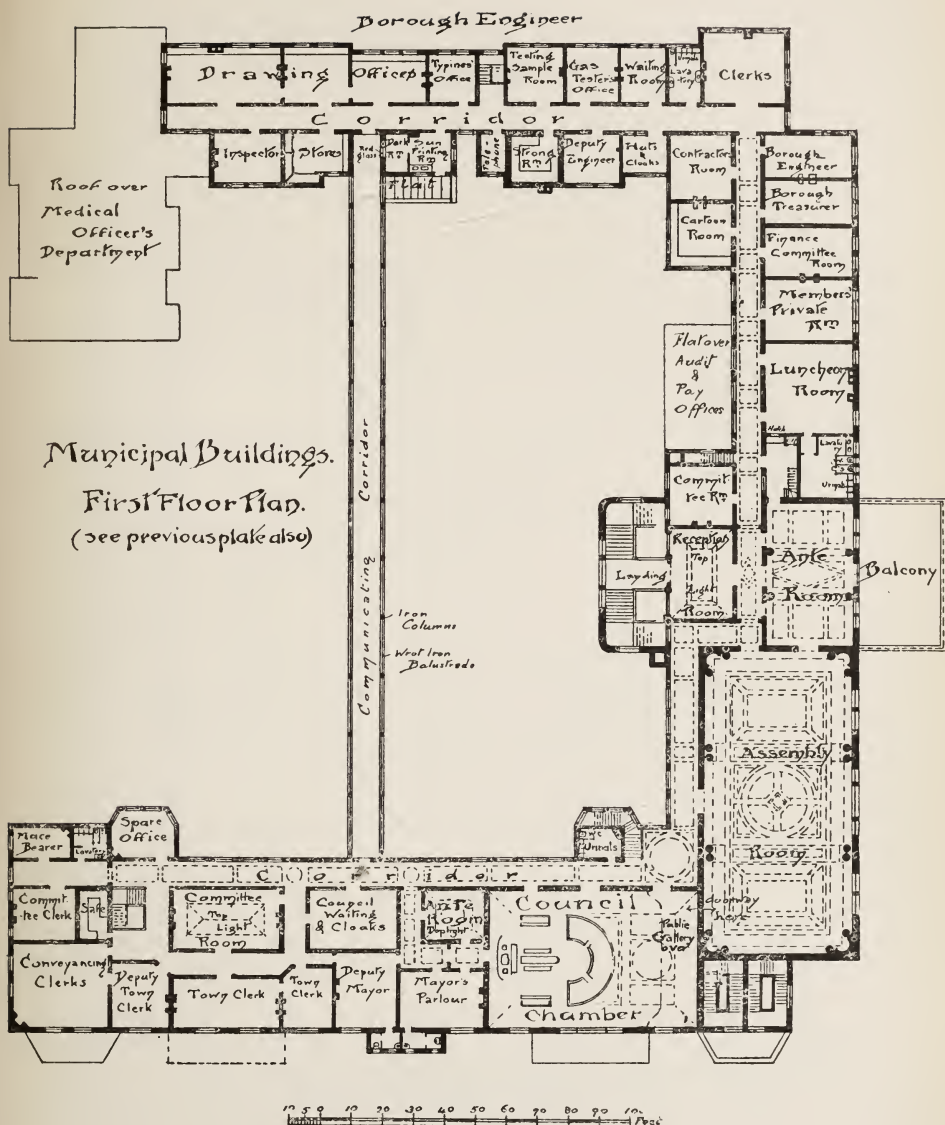
For plans see Plate XXXVI., a design by Mr W. Harpur, County Borough Engineer of Cardiff, who has kindly supplied the following notes:—"The gallery shops and stalls have proved unworkable generally throughout the country, the ground floor having to accommodate all classes of goods. The butchers' shops would be better if fitted as two to each 24 ft. bay, instead of three to the bay."

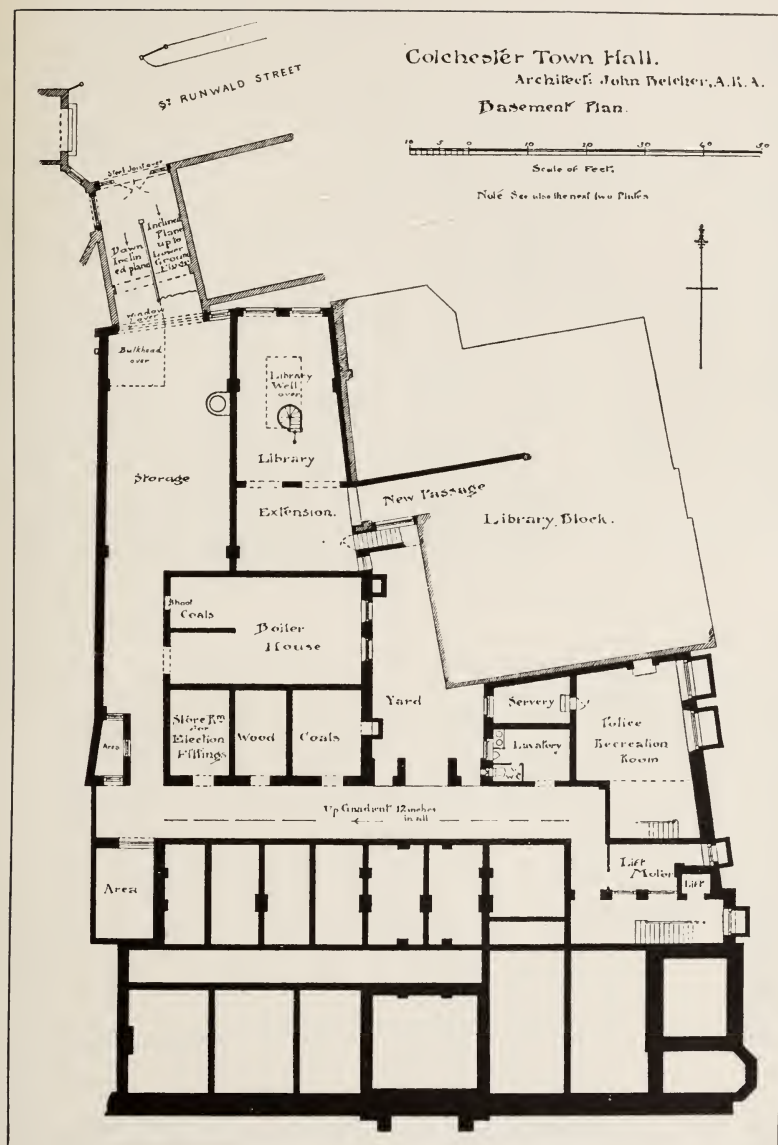
Municipal Buildings.—(*a.*) Good inter-communication of offices, good lighting, seclusion of strong-rooms, grouping, and (if the buildings are on a large scale) dignity of plan, spacious corridors, and adequate entrances.

(*b.*) Council-chamber and committee-rooms, mayor's and deputy-mayor's parlours, mayor's ante and reception rooms, waiting-room, room for journalists, town-clerk's and deputy town-clerk's private offices, and town-clerk's department (consisting of clerks' offices, waiting, telephone, and typewriting rooms, and strong-rooms), and each department will have similar accommodation. There should be ample W.C., lavatory, and cloaks' provision for each department. An assembly-room suite is a frequent requirement. The medical officer's department would have clerks' offices and laboratory. The surveyor's and engineer's departments would each require plan and contractors' rooms and drawing offices in place of the ordinary clerks' offices. Corporation and staff luncheon-rooms, and kitchen department.

The public would be accommodated in a gallery to the Council-chamber when attending the municipal meetings. As regards this chamber, the unit of accommodation is the seating area per councillor, and this should be provided for on a







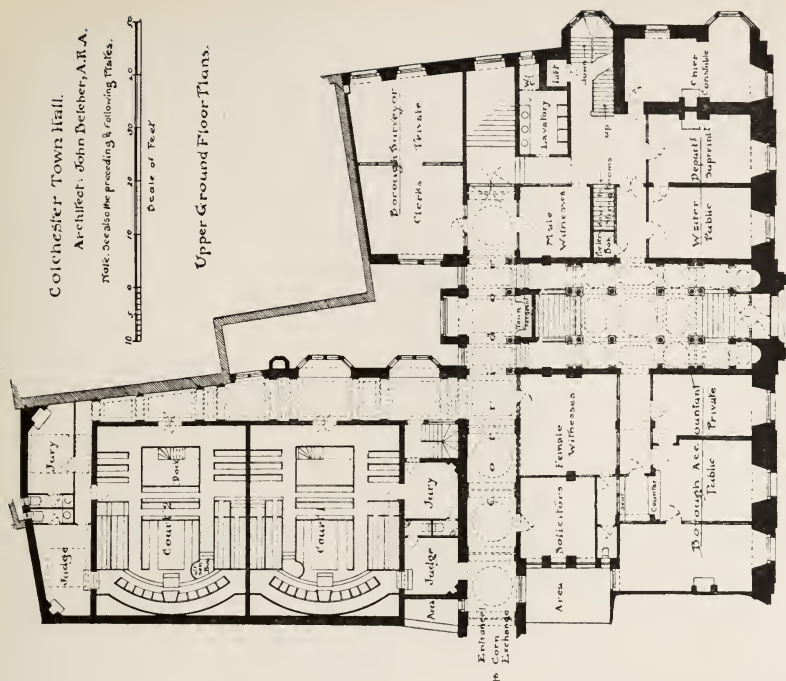
Colchester Town Hall.

Architect: John Deleber, A.R.A.

Note: See also the preceding & following Plates.



Upper Ground Floor Plans.



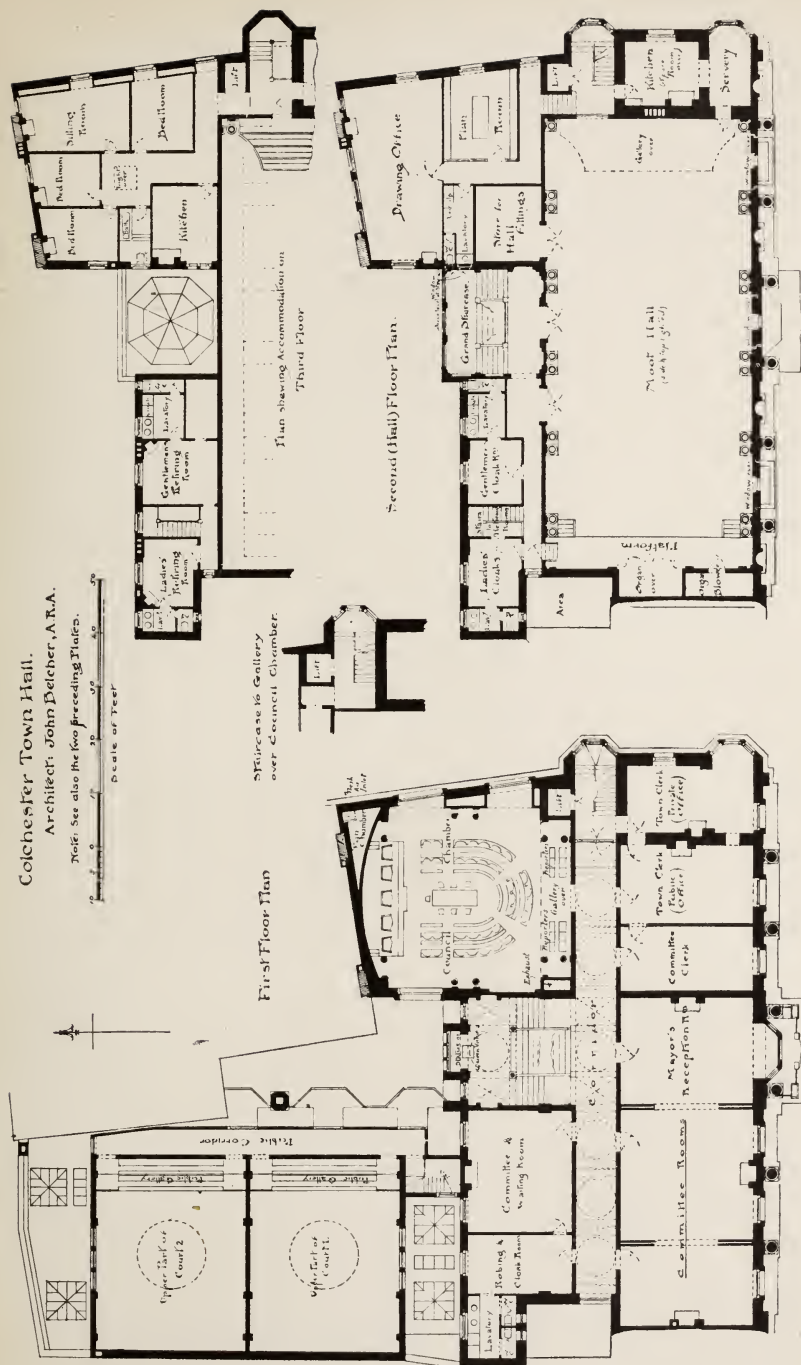
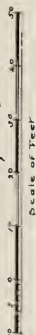
Lower Ground Floor and

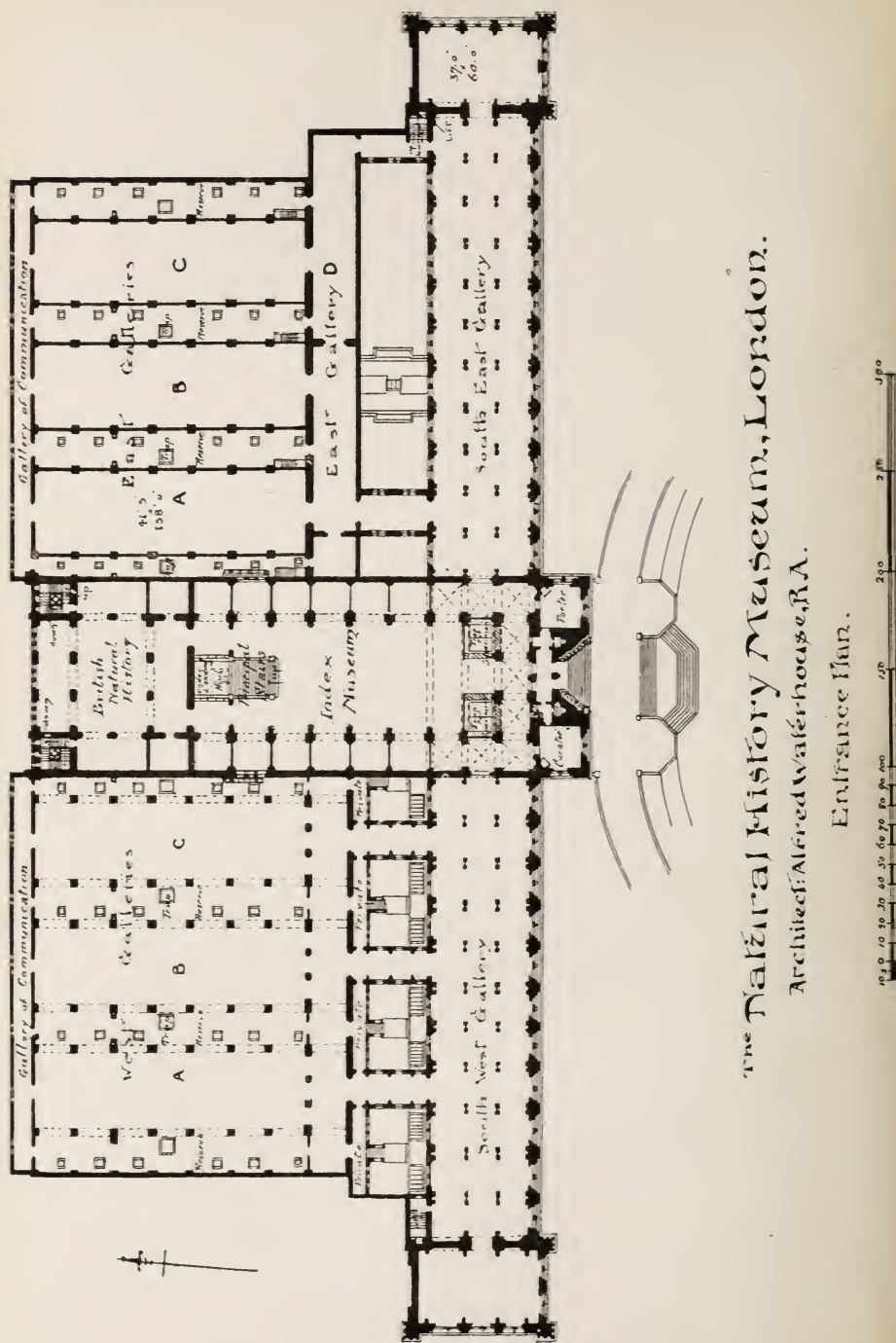


Colchester Town Hall.

Architect: John Belcher, A.R.A.

Note: See also the two preceding Plates.





THE NATURAL HISTORY MUSEUM, LONDON.

Architect: Alfred Waterhouse, R.A.

Entrance Hall.

generous scale; and generally in regard to the offices, there is not any specific maximum or minimum size in such buildings. The plans given on Plates XXXVII. and XXXVIII. are adaptations from a scheme submitted in competition some time since, and will serve to illustrate municipal requirements on an extended basis. Very simple schemes suffice for small boroughs. An interesting example of a provincial town hall for a population of about 40,000 is that erected at Colchester (Essex) from the design of Mr Belcher, A.R.A., and illustrated on Plates XXXIX., XL., and XLI.

Museum.—(*a.*) Ample unencumbered floor-space, good lighting, efficient supervision, symmetry of plan, storage accommodation.

(*b.*) Plenty of museum accommodation (including floor-space for show-cases and wall-space for charts, diagrams, and pendant objects, etc.); curator's offices, delivery and packing rooms, stores, lifts, W.C.'s and lavatories, porter's room, and residence for caretaker.

In scheming these buildings it is to be borne in mind that ample gangway should be allowed both for easy transit of the public and for the shifting of show-cases, etc., as frequently there is a transfer of objects to other museums; and from other causes a permanent stationary arrangement is infrequent. The delivery and packing rooms should be of good size, so as to give plenty of elbow-room, and to minimise the chances of breakages.

The floor area should be as little encumbered as is possible with constructional supports, and by the use of iron and steel this is easily managed. Lighting should be ample, and by preference should be both from sides and top; but the former should be at a higher level than the position for hanging objects, otherwise valuable space is lost for museum purposes.

A plan of the Natural History Museum, London, by Mr Alfred Waterhouse, R.A., is given on Plate XLII.

Music Hall.—(a.) See under “Concert Hall.”

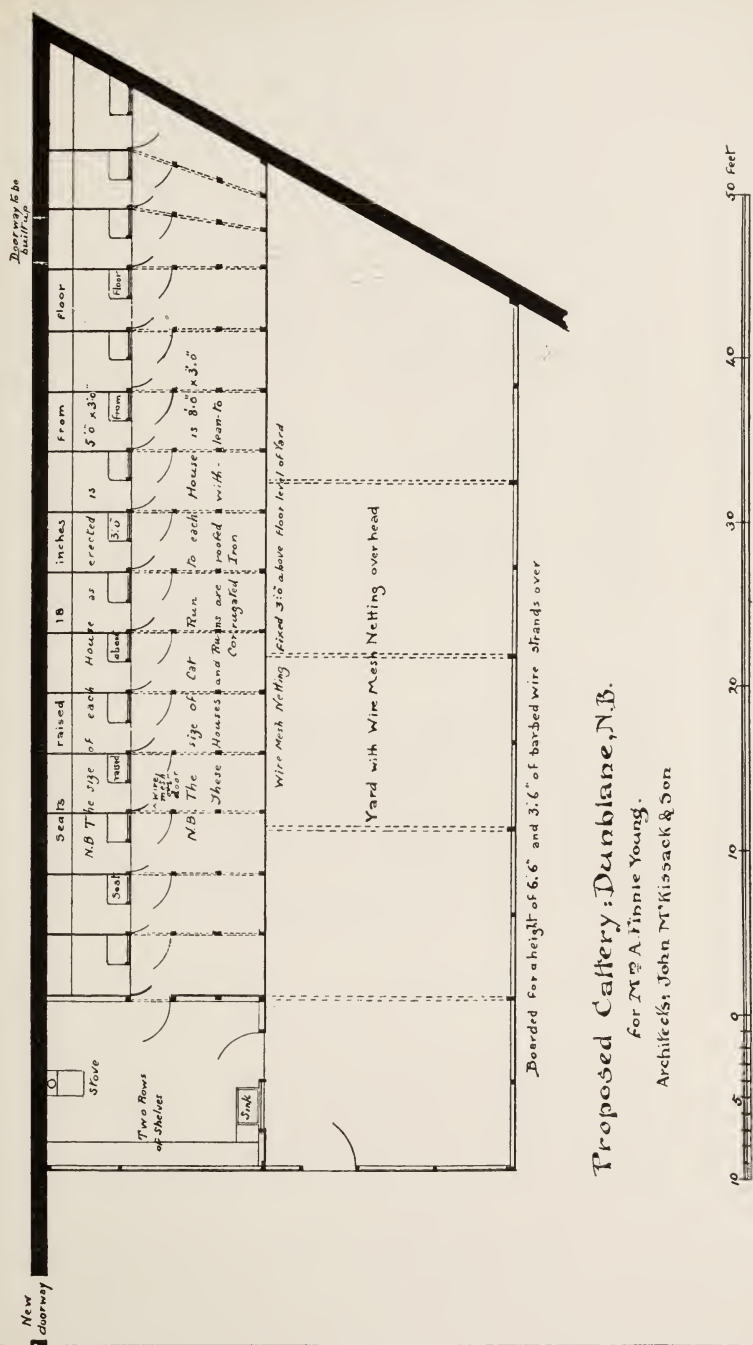
(b.) It may be borne in mind that a foyer and a refreshment-bar should be provided to each tier.

If a license for stage plays is desired, the scenic arrangements must be planned accordingly.

Outbuildings.

Cattery.—It may be supposed that this is more often required now than when this book was first written. The requirements in accommodation are shelters (or houses) and “runs.” Where stud-cats are kept, each of course has a separate house and “run”; but for all ordinary purposes, one “run” and shelter answer. These should be roomy, carefully built so as to provide ventilation without draughts, and should be dry; means of artificial heating by night and in cold weather are generally advocated. The shelter should have the floor well above the ground level, but the boards should be loose for easy removal. Two or more shelves should be fitted, as cats like to make themselves comfortable at different levels. In the “run,” part of the ground should be finished with mould, part with grass, and part may be cemented or asphalted. Forked stumps of trees in the “run” are a desideratum for the same reason as are shelves in the house. The “run” should be enclosed on the sides and top with two thicknesses of small-mesh wire netting, kept apart some 4 to 6 in., so as to obviate the chance contact of the home cats with vagrants. An “infirmary” house would be required in a large cattery. A plan of a cattery is given on Plate XLIII.

Cow-house.—Primarily, it may be noted, that in London, the County Council has issued Bye-laws under the Public Health Act of 1891, regulating the erection of such houses—a highly necessary act of legislation, as it has



a direct bearing on the bills of mortality. Some dimensional sketches (Fig. 11) are appended showing different types of houses, and it is only requisite to note otherwise, that it is permissible to house two cows in one stall (if the regulation width be given) and it is likewise *en règle* to have a double row of stalls, with a choice as to position of feeding and dunging passages. Bye-laws under the Public Health (1875) Act are issued

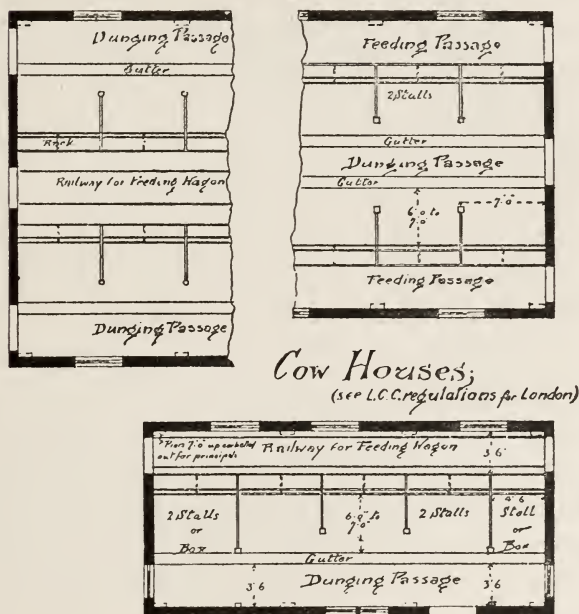


FIG. 11.

by many of the extra-metropolitan authorities for the regulation of dairies, etc.

Cycle-house.—This is customarily a weather and match-boarded shed, the basis of accommodation being of course the size of the cycle. The following dimensions will be useful :—

				Inside Dimensions.			
				ft.	in.	ft.	in.
A house to hold one bicycle will suffice at				6	3	by 2	0
"	"	two bicycles	"	6	3	" 3	6
"	"	one tricycle	"	6	3	" 4	0

The floor of the house may advisably be raised 2 or 3 in. clear of the ground, as a preventative against damp inside; but at the same time the space beneath should be well ventilated, or the result desired will not be ensured.

Dog-kennels.—These are planned either in the form of “boxes,” *i.e.*, association houses, or else as single hutches. Dogs being hardier by nature than are cats, do not require their houses to be artificially heated, but draughts should be avoided. Each “box” and yard suffices at 36 ft. superficial area severally. Separate hutches vary of course with the species of animal, but the requirements range from about 2 ft. 6 in. to 12 ft. super. per dog in hutch, and the floor should be raised a few inches from the ground. The floor of yard should be hard and impervious, and the enclosure should be iron fencing; but this will be merely required as a vertical enclosure, the top being left open.

Piggery.—This is frequently built with small sleeping-hutches and feeding-yards for each animal; but it is growing in favour to house swine in “boxes,” each about 80 ft. super. in area, and each capable of holding a sow and litter. A portion of the box should be left open, and a feeding-yard should be attached to the series.

Poultry Run.—This may be any convenient size, and should be completely enclosed with small-mesh wire netting. Sitting (or nest) boxes and a roosting-house are requisite. The houses should be raised half-a-yard or more from the ground level, and should allow of a free passage of air beneath. A sunny aspect is a desideratum. The following approximate dimensions will be useful :—

A house 4 ft. by 4 ft. will accommodate 12 fowls.

„	5 ft.	„	5 ft.	„	„	20	„
„	6 ft.	„	5 ft.	„	„	35	„

and this gives room also for nest-boxes inside. A sketch of a fowl-house is given in Fig. 12. If ducks are kept, duck-pens, pond and yard are requisite.

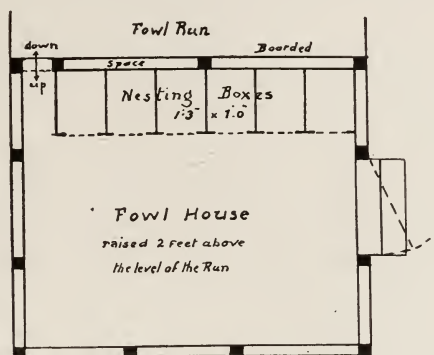


FIG. 12.

Stables and Coach-houses.—(a.) Lighting, spaciousness, grouping.

(b.) Stalls for nags, hunters, carriage-horses, visitors' steeds, etc.; loose and sick boxes; washing-box (or space) for horses; covered washing space for carriages; coach-house (or houses); harness-room; mess-room; tack-room; coachman's rooms; loft for corn and hay with bins (fodder store); stable-yard with dung-pit; W.C. (or E.C.), etc.

It will be understood that the accommodation scheduled above is only necessary in its entirety in large hunting stables. The requirements will be modified for other establishments.

For stalls, the customary dimensions are 6 ft. wide in clear by 9 ft. 6 in. deep over heel-post; this depth is at times, however, increased. The stall divisions are usually 2 in. thick. A passage 6 ft. to 8 ft. wide (or more) should traverse the whole length of stall accommodation. Loose-boxes and sick-boxes are habitually 10 ft. by 12 ft., but in these cases also, the dimensions are at times increased. In connection with sick-

boxes, there would be a copper for the preparation of bran-mash ; these boxes should be treated after the manner of "isolation hospitals," *i.e.*, they should be secluded.

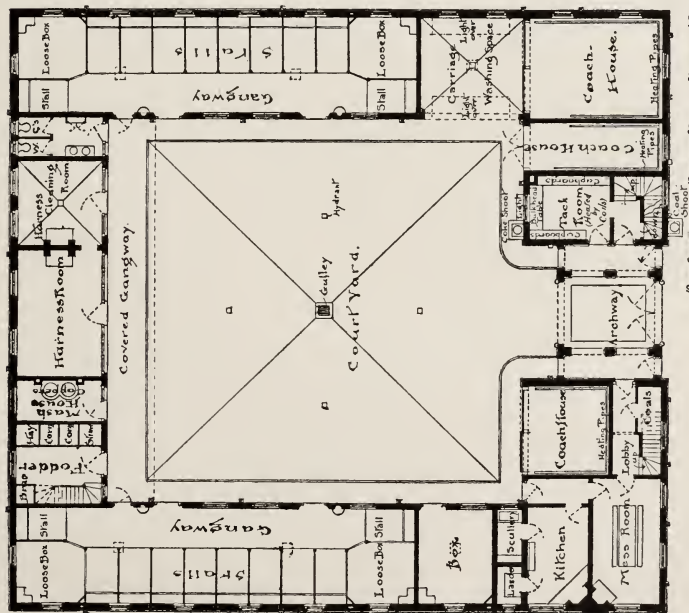
It has been estimated, that each animal should have a minimum floor space (inclusive of share of gangway) 120 ft. super. in area, though this exceeds the usual provision. Racks and mangers vary in width from 15 in. to 20 in. Stable doors are usually 4 ft. wide. If the hay and corn are stored in a loft, shoots will be formed, and a corn-meter fitted to the corn-shoot. A coach-house should have, as a minimum size, 10 ft. by 18 ft. ; it is inadvisable that the depth should be increased for the purpose of housing carriages tandem, for should a large number require accommodation, it is well either to have a series of houses, or else to range the carriages side by side. Coach-house doors (usually hung in pairs) require a width of at least 8 ft. ; these doors are not infrequently made to slide, instead of opening outwards. Very rarely do carriages or coaches exceed 14 ft. in length when the shafts are raised.

Motor-cars vary very greatly in size, the maximum width allowed being 7 ft., and altogether a smaller house may be provided than is customary for coach-houses. If motor-cars are kept where there are horses also, they should be housed some distance from the animals, to whose delicate sense of smell the odour of petrol or gasolene would be offensive. The storage of the power-generator should be carefully considered in respect to fire safeguarding.

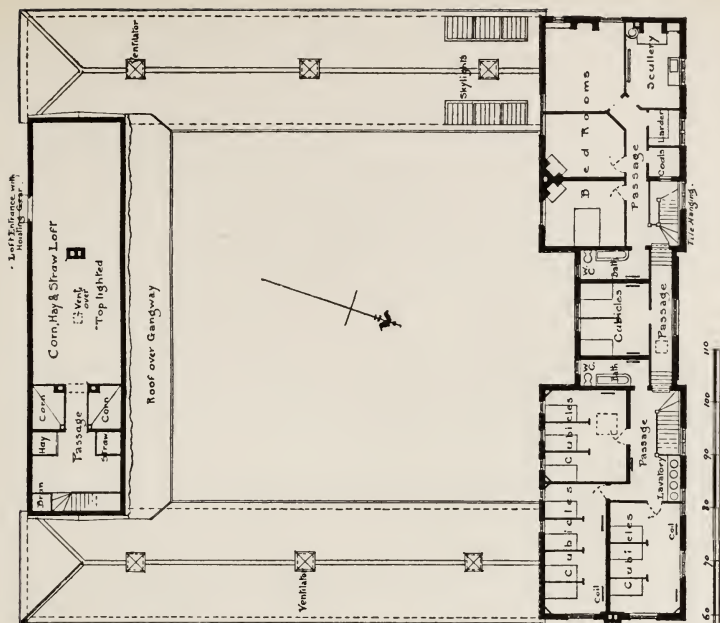
In large establishments, the hollow-square or quadrangular treatment of plan is effective, and is also economical from a service standpoint. All corners, internal and external, should be well rounded, so as to minimise the chances of unpleasant abrasion. On Plate XLIV. are given plans of stables by Mr R. W. Edis.

Palace, Royal.—(*a.*) Spaciousness and stateliness, grouping, prospect, aspect, symmetry, dignity of plan, special exits.

Stables for the late Sir J. Blundell Maple Bart
at Childwickbury, Herts.
Architect K.W. Edis, C.D., F.S.A.



Ground Plan



First Floor Plan.

(*b.*) Various suites of State apartments, banqueting chamber, picture-gallery, music-room, etc.; private suites for Sovereign, guests, and establishment; business department (containing secretarial and clerical offices, telegraph, despatch, and telephone offices, strong-rooms, etc. etc.), waiting-halls, pages' and messengers' rooms, library, chapel, etc., kitchen and laundry, heating and lighting departments, stores, guard-house, stables department, etc. etc.

Palaces should be planned on a generous scale, though not infrequently the accommodation in past years has been very inadequate. Whilst the accommodation mentioned or implied above would be essential in all properly equipped buildings of this nature, there might be additional provision at option, such as armoury, museum, theatre, etc. Special exits and escape stairs should be provided, seeing the large number of people that will be housed in a palace.

Parliament Houses.—(*a.*) Acoustic requirements of legislative chambers, dignity of plan, good lighting, ample provision of committee-rooms, accommodation for the public and the Press.

(*b.*) Legislative chambers (with their division and entrance lobbies, and public and Press galleries), numerous committee-rooms, private suite for head of State, residence for Speaker of each House, library (and librarian's residence), ministers' private rooms, deputation and waiting rooms; coffee, luncheon, etc., rooms; smoking-room, newspaper and writing room; postal and telegraph department, telephone-rooms, typewriting and clerical offices, strong and records rooms; kitchen and other service departments, rooms for chief officials, etc. etc.

The planning of such buildings should be on a generous scale, both on account of their natural importance, and also

because of probable periodical increases in representation necessitating increased area. In some Board-rooms each member has table as well as bench accommodation; but in a large legislative chamber, though the principle still holds good, it is not always allowed to hold sway, on account of the great increase in area it would entail.

Piggery.—See under “Outbuildings.”

Police Court and Station.—(*a.*) Good and secluded communication between Court (or charge office) and cells, and secluded position of latter and of detectives' room; accommodation for the public and the Press in the Court.

(*b.*) The accommodation for Court-houses would be one or more Courts, magistrates' room, offices, waiting-room, solicitors' room, cells, consultation room for prisoner and his counsel, lavatories, etc.

(*b.*) The accommodation for stations would be inspectors' office, charge and clerks' offices, cells and airing yards, combination rooms, waiting-rooms, parade-ground, stabling, lavatories, stores, residential quarters for police.

The accommodation above noted is regulated by the stated requirements in each case, and is under the jurisdiction of the Prisons Department of the Home Office as regards the United Kingdom. A pamphlet is issued by the department, and in conjunction with some illustrative sheets of plans it contains some very useful and interesting information. A portion of one of those plans is given in Fig. 13.

Polytechnic and Similar Institutes.—(*a.*) Good accommodation in lecture-rooms, class-rooms, and workshops; good lighting; efficient corridors and staircases; requirements for entertainments and general social purposes.

(b.) Numerous class and lecture rooms and work-shops ; library ; great hall (with platform) ; smaller hall or halls (with movable platforms) ; recreation, club,

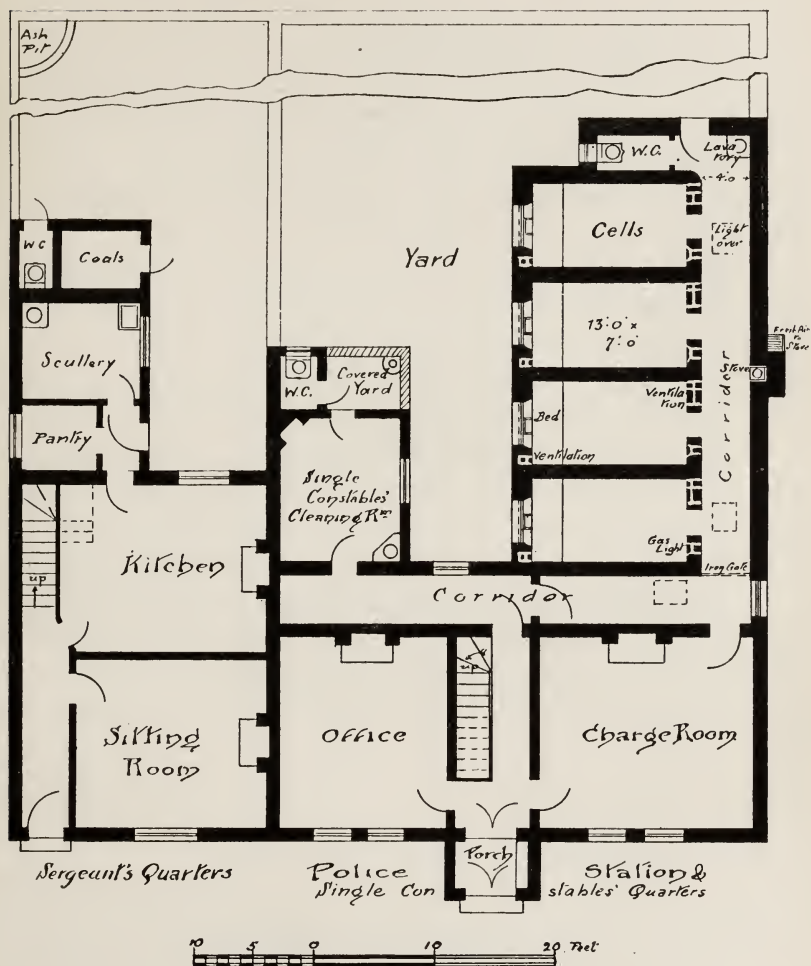


FIG. 13.

and refreshment rooms ; gymnasia ; cloaks, lavatories, W.C.'s ; heating, mechanical, and lighting departments ; director's, secretary's, and instructors' rooms, stores, etc.

The actual basis of accommodation varies, naturally, with the individual room, though in every case where the main apartments are under consideration, the basis bears reference to the requirements of the scholar as unit.

It may be of interest to note the following :—

The *medium* dimensions for a carpenter's bench are 4 ft. length by 1 ft. 4½ in. width. For a cabinetmaker's bench for a technical school a length of 6 ft. by a width of 2 ft. will suffice. These dimensions are for table-tops, but exclusive of projections.

In the entertainment halls a width of 1 ft. 10 in. by a depth from front to back of 2 ft. 6 in. will suffice, per sitting.

Both good top and side lighting are requisite for obtaining the best results. Lockers and cupboards should be largely provided for the students.

The object in planning a polytechnic should be to obtain room for the maximum number of students that might reasonably be expected to avail themselves of the facilities provided in the particular district; and wasted space in the building should be deprecated, except it can be utilised as accommodation for additional students. The recreative portion—that is the entertainment halls—requires to be proportionally much larger, to accommodate friends of students.

For plans of the Central Technical College, London, see Plates XLV. and XLVI., by Mr Alfred Waterhouse, R.A.

Postal and Telegraph Office.—(*a.*) Good accommodation for public; good lighting; separate entrances for public and officials.

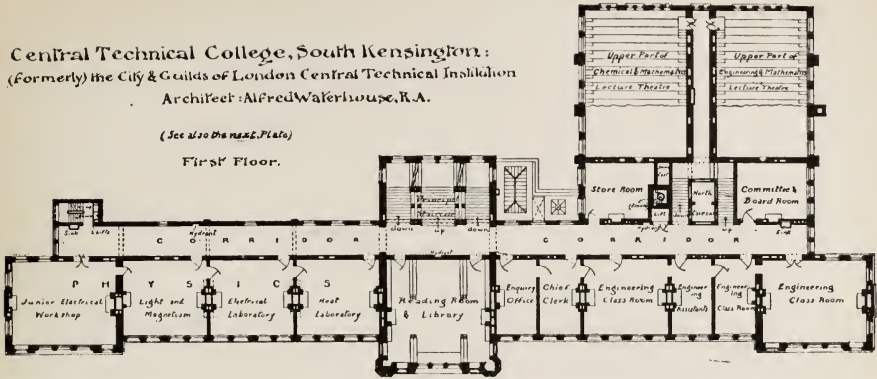
(*b.*) Public and official portions of hall; counter; telegraph boxes; postmaster's room; telegraph and sorting offices; strong-rooms; telegraph and express messengers' room; postmen's room; residential rooms, lavatories, etc.

On Plate XLVII. an interesting plan is given, showing one

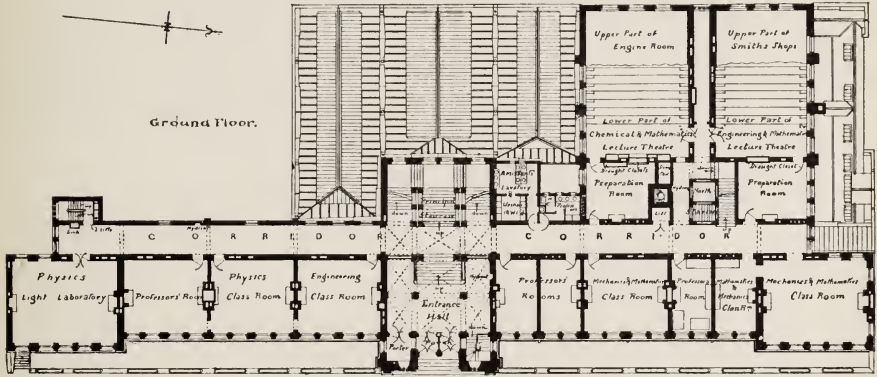
The Central Technical College, South Kensington:
(Formerly) the City & Guilds of London Central Technical Institution
Architect: Alfred Waterhouse, R.A.

(See also the next Plate)

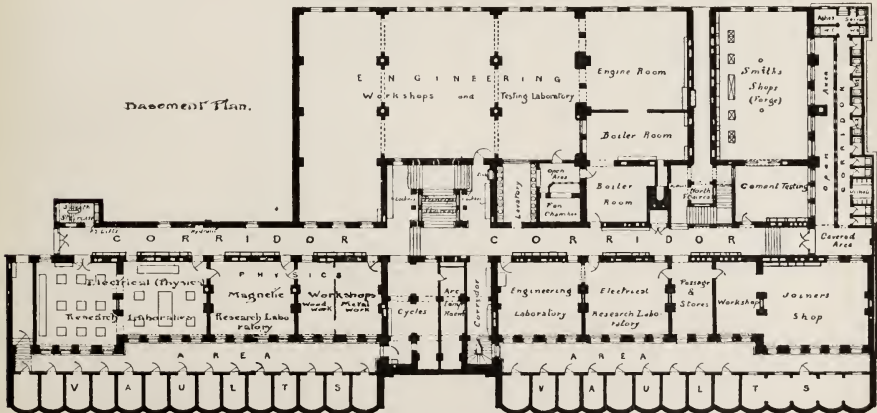
First Floor.



Ground Floor.

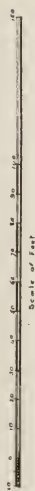


Basement Plan.

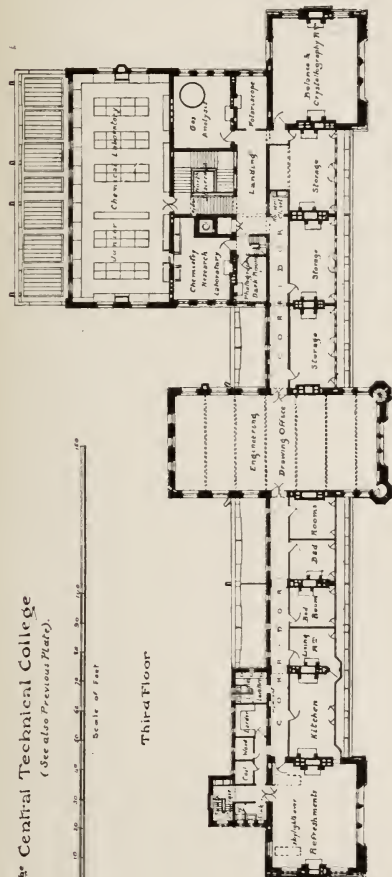


Scale of Feet

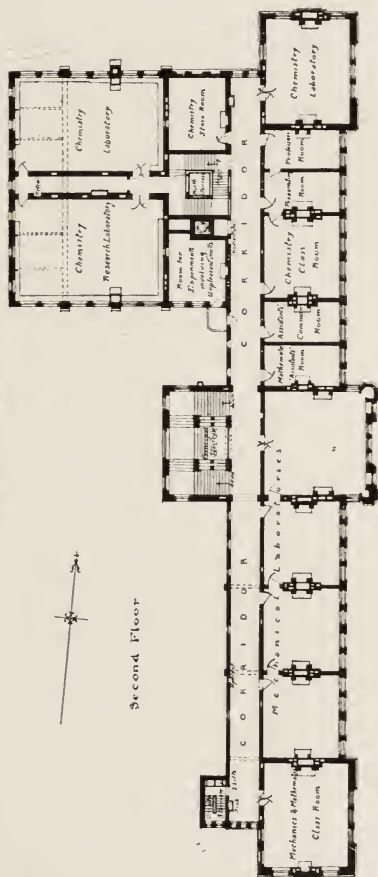
Central Technical College
(See also Previous Plate).

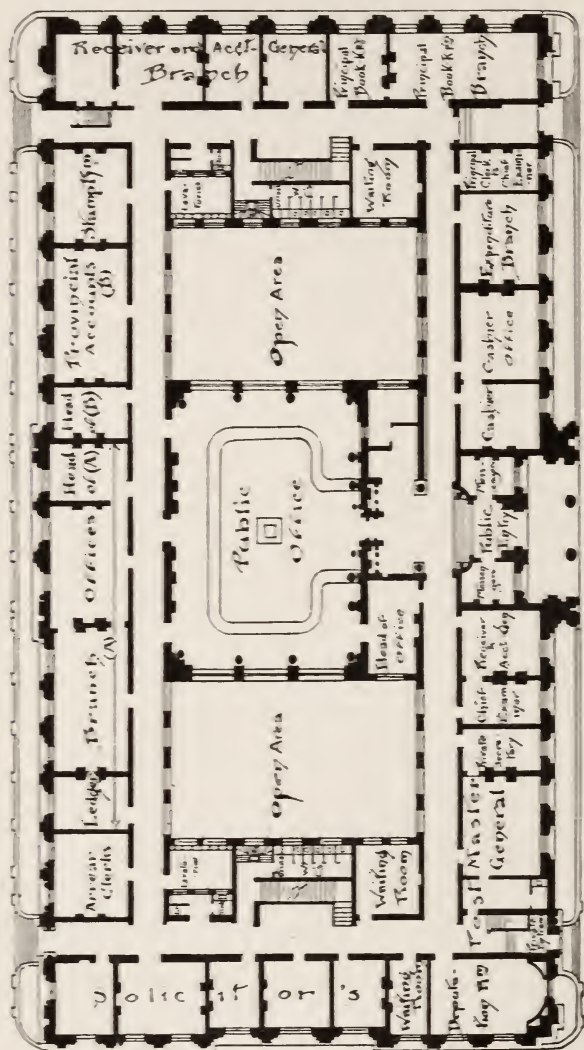


Third Floor



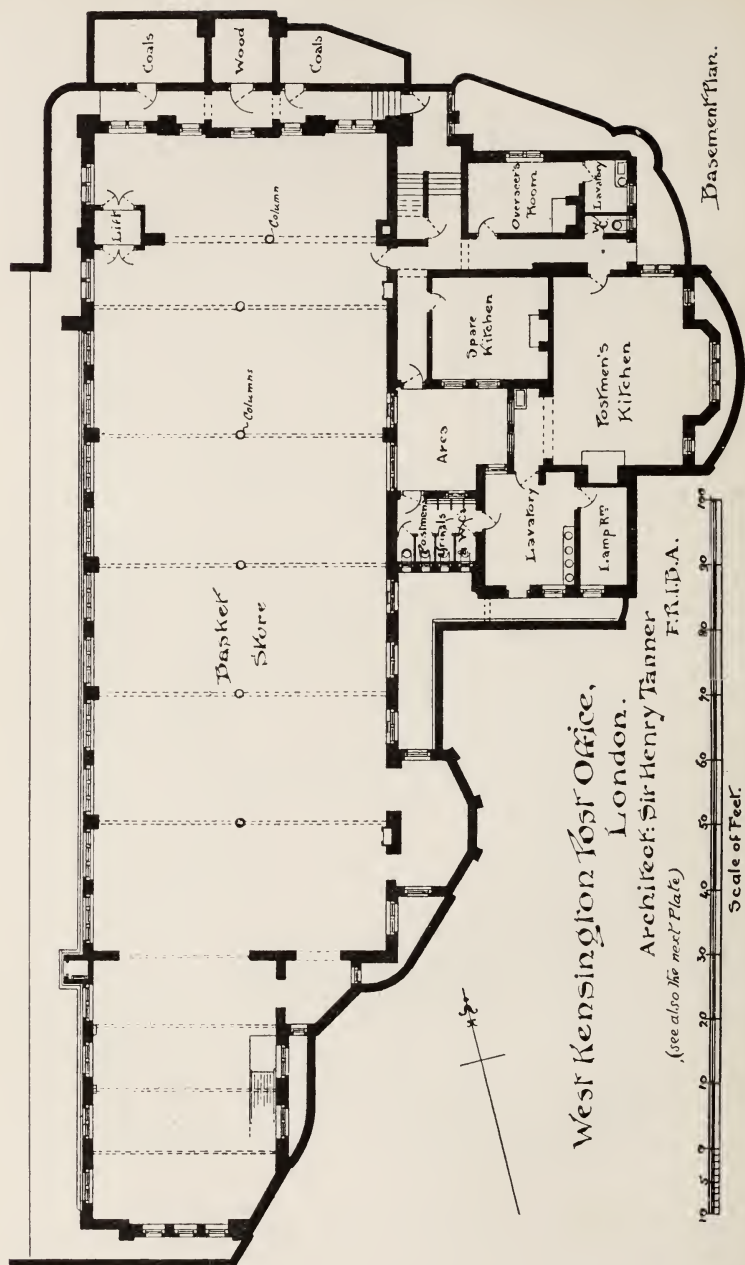
Second Floor

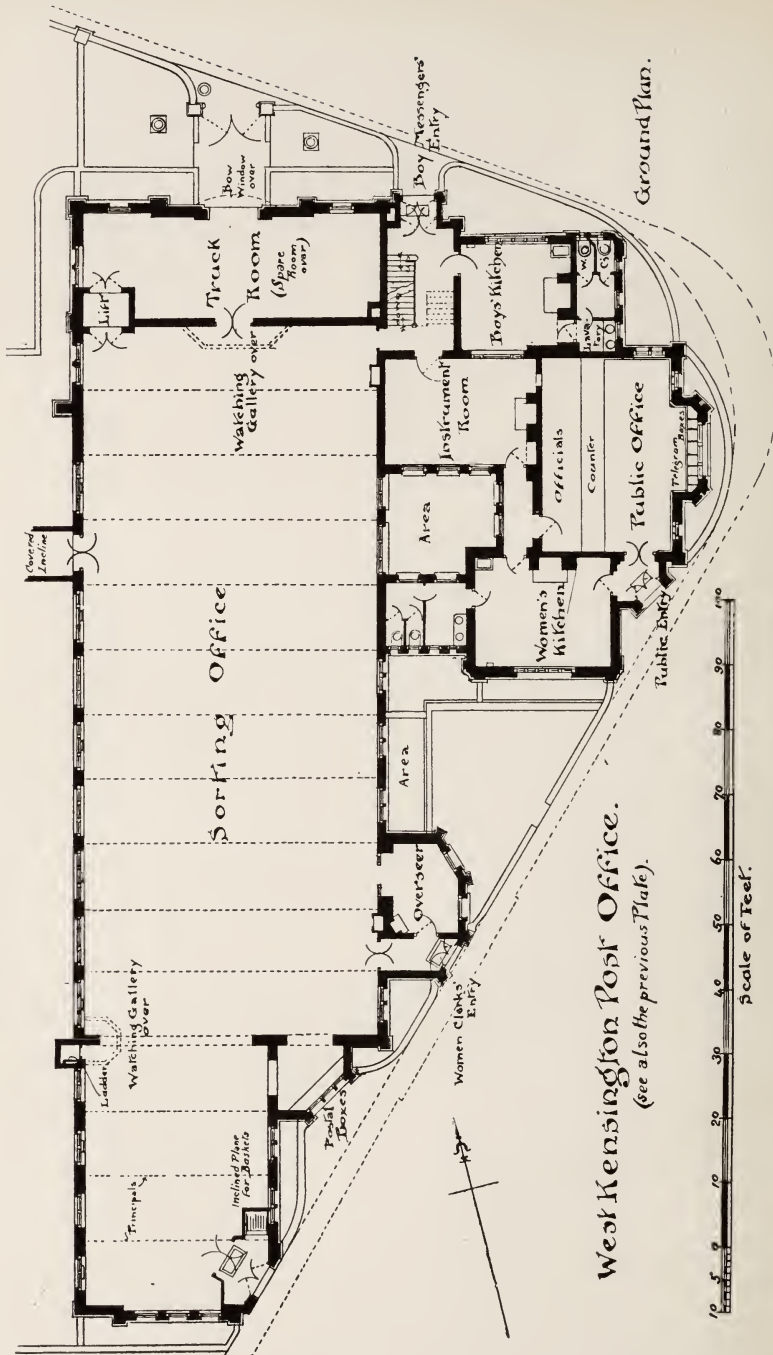




Ground Floor Office Block, St. Martin's-le-Grand, London.

Architect: A. Williams.





floor of a block at St Martin's-le-Grand, London, designed by Mr A. Williams; and on Plates XLVIII. and XLIX. are given plans of an Office designed by Sir Henry Tanner (H.M. Office of Works).

Poultry Run.—See under “Outbuildings.”

Refreshment-rooms, Restaurant, Café, etc.—(*a.*) Roominess, ease of supervision and service, minimum of intermediate points of support.

(*b.*) Large dining, etc., space for public, ladies' room, smoking-room, manager's room, grill-room, lavatories, cashier's box or boxes, counter space, service-lift enclosure, kitchen, scullery, stores, etc.

It must be remembered that not all this accommodation will be of necessity required, but in all of these buildings the basis will be the amount of room per individual seated at table. And of equal importance is it to provide table accommodation to suit parties varying in number, the tables consequently being of a size to take two, three, and four people for the most part, though it is well to provide some to accommodate larger parties. The space per consumer may advisedly hold a middle place between that provided in a school and the provision in a social dining-room, but the gangway accommodation should be greater. In some of the most modern restaurants there is no niggardliness shown in this or other respects.

In cafés, the space required is considerably less than in those houses that cater for big appetites. Round tables, about 3 ft. 6 in. diameter, or less, are very suitable for cafés and similar places, the absence of sharp angles being highly desirable.

Of all those establishments that are open to both sexes, a smoking-room and a ladies' room should, together with a general room, form integral features. In the first mentioned, the gangways may be modified in width to an extent that would be

unjustifiable elsewhere, due to the absence of the flowing and sweeping skirts of the gentler sex; for, though the attendants are very frequently women, yet as they wear close-fitting skirts, the latter do not take up much room.

It will be borne in mind, of course, that in thus discussing possible restrictions of width, they are not recommended for comfort, but only mentioned as possibilities.

The minimum width of gangways should be 3 ft., to permit of the passage of two people without discomfort. Though perhaps not intimately concerned with the architect's duties, yet it is as well to note that chairs having umbrella attachments should be provided. Hat and coat pegs are also necessary, and in this connection it may be noted that, though piers and columns in the body of the hall are apt to be a nuisance, yet their presence very much facilitates the provision of these pegs; and moreover, it may be possible to fit with effect a circular table round a column.

The cashier's box need not be more than 3 ft. wide by 2 ft. 6 in. to 3 ft. deep. The gangway for attendants behind the counter should be about 2 ft. 6 in. minimum, and the counter itself not less than 2 ft. 6 in. wide.

School of Art.—(*a.*) Ample accommodation for the students; aspect; good side-lighting and top-lighting.

(*b.*) Various class-rooms, models' room (in connection with life studios), masters' room, W.C.'s, cloaks and lavatories, stores, caretaker's rooms, etc.

In considering a building of this nature, conditions are presented very different to any possessed by other schools; though the basis is the requisite area per student throughout, yet the calculations for art schools differ totally from those for ordinary schools. Whether the class be one for life-study, model-drawing, or sculpture, it is to be noted that a comparatively large unoccupied area is required as contrasted with the school or class room in ordinary circumstances.

It may be granted, to start with, that if the room is suitable for drawing, it will answer for the other arts. It might perhaps be contended that sculptors value a low or "under" light, which for other purposes is, however, undesirable. This is quite correct, but it should be remembered that what may be of paramount importance to people exercising their art professionally, may be dispensed with as regards the students in an elementary or chrysalis stage. However, if the sculpture studio is provided in a special room, any doubt as to treatment is solved. Considering, therefore, the individual student's requirements, 9 ft. super. (*i.e.*, 3 ft. depth by 3 ft. width) of space is not excessive, when the requisite easel is allowed for. Another factor in the scheme is, that for correct focussing, the model should be distant from the eye of the student at least twice the length of the longest dimension to be included in the sketch. In an art school, such dimension is likely to average 5 ft. (it is *this* dimension from which measurements would be taken, and not the extremities of the object to be copied). The model acting as the focussing point, radial lines of a length of 12 ft. obtain, *i.e.*, twice 5 ft. = 10 ft. + 2 ft. of the 3 ft. depth of space for student (the other 12 in. being for the easel, which obtrudes into the 10 ft. just mentioned). There should be at least a further 2 ft. depth behind the student's pitch. This will produce a diameter of 28 ft. The best treatment in such a studio would be either a semicircular room, or else a rectangle based on a semicircle, in this instance not less than 28 ft. by 14 ft. The next point to establish is the number of students that such a room would accommodate. The radial line to the station point of the student is 10 ft. (that is equivalent to a diameter of 20 ft.), which has a semi-circumference of approximately 31 ft. 6 in. Allowing about 3 ft. width of space per student this room would accommodate eleven, as there would be the width of the side gangway as a necessary addition; were it not for this gangway, only ten students could be accommodated. Customarily a room of this size would be utilised for a greater number at some sacrifice of comfort and convenience.

An art-room in a secondary school provides 30 sq. ft. per scholar.

School, Board.—(*a.*) Efficient light and space; acoustic and optical requirements; separation of boys, girls, and infants (but make a note of the provision of “mixed schools”); efficient entrances and staircases.

(*b.*) Class and school rooms; often a central hall; cloak-rooms, teachers’ rooms; open and covered playgrounds, with latrines; heating chamber, etc., stores; residence.

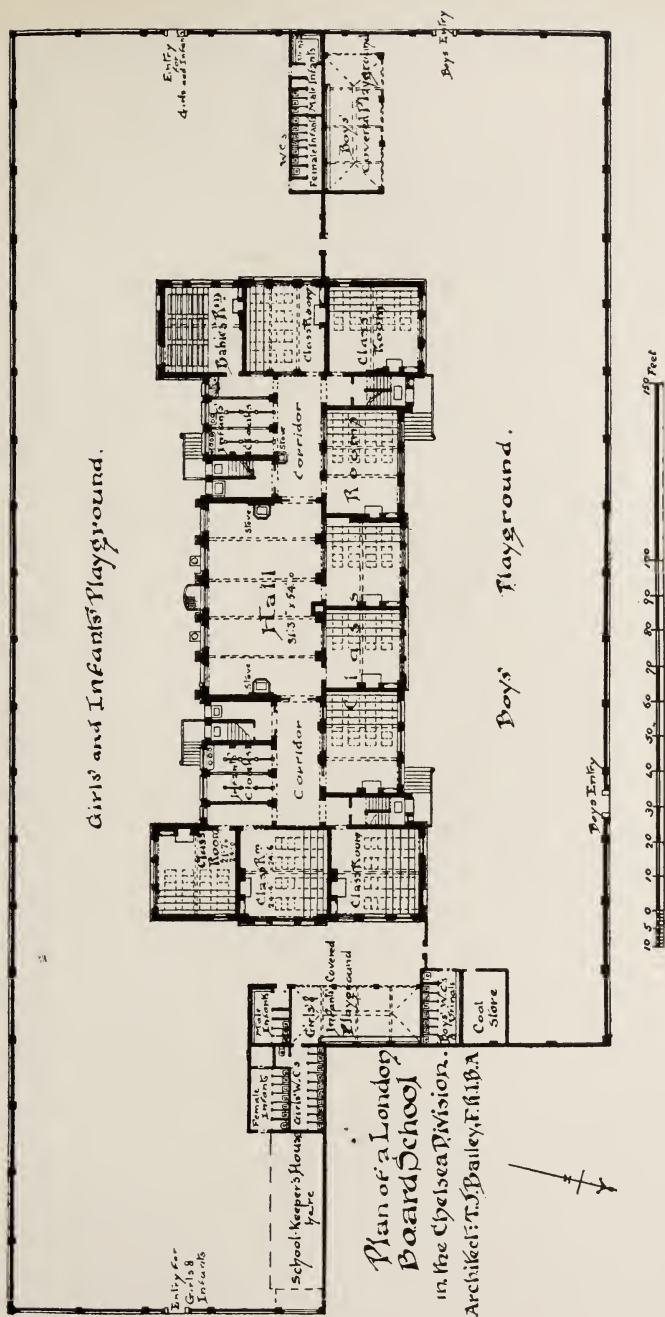
The planning of schools of the public elementary and secondary types being so intimately controlled by the Board of Education, it has been thought well to give as Appendixes to this work the requirements affecting the planning of these buildings (see Appendixes C and D). A plan of a Board School in London by Mr T. J. Bailey is given on Plate L.

School, Medical.—(*a.*) Ample accommodation for the students; good side-lighting.

(*b.*) Lecture theatres, laboratories, dissecting-rooms, library, common-rooms, professors’ rooms, refreshment-room, cloak-rooms, W.C.’s and lavatories, secretary’s office, stores, housekeeper’s apartments, etc.

A school of this nature is usually attached to each of the large general hospitals, and in addition to the above accommodation it must be borne in mind that a portion of the education is clinical, that is, instruction given in the hospital ward with the patients as illustrative examples; and furthermore, the students are present during operations in the operating theatres, where they are by preference railed off in a gallery.

Schools, Miscellaneous.—(*a.*) Sanitary requirements; efficient means for tutorial supervision; provision for athletics;



privacy of Principal's quarters ; good lighting ; efficient panic exits ; good staircases ; aspect.

(b.) School and class rooms, dining-hall, dormitories (some divided up into cubicles), lavatories, bath-room, sick-room, music-room, "studies," library and museum desirable, gymnasium, cloak-room, open and covered playgrounds, W.C.'s, house-teachers' common-room and bedrooms, head-teacher's private apartments, kitchen and offices, laundry block desirable, stores, etc. etc.

The calculations for a school dormitory are based as follows :—The bed to be 5 ft. 6 in. in length by 2 ft. 6 in. width, and to stand 6 in. clear of the wall, with an allowance at foot of 2 ft. to the centre of longitudinal gangway. On either side of the bed a clear space of 1 ft. 9 in. to centre line of cross gangways is to be provided ; this gives a length of 8 ft. by a width of 6 ft. per bed, equal to 48 ft. super. With a height of 10 ft., there will be an air space of 480 cubic ft. per boarder. The unit of area and capacity required in a dormitory differs from that required in cubicles, for in the latter case 8 ft. by 8 ft. should be the minimum size. The gangway will suffice at 3 ft. width. The house-teachers' bedrooms should be of a minimum size of 10 ft. by 12 ft., to accommodate a bed (6 ft. 3 in. by 3 ft.), a small chest of drawers, washstand, and two chairs. Each of these bedrooms should have a cupboard. An escape-staircase should be provided in a good central position.

The sick-room should provide on an average one bed for every fifteen scholars ; and there should also be an isolation room or building, for doubtful cases.

The principal school-room should be large enough to hold, on occasion, the whole of the scholars and a proportionate number of visitors. By means of folding partitions, portions can be habitually screened off for use as class-rooms. The floor space per scholar may be taken at 5 ft. 2 in., but if the total area of the room be considered, the superficies per scholar should be taken at 10 ft.

The calculations for the dining-hall should be as follows, allowing for one additional table beyond those necessary for the accommodation of the boys. To take a definite case, consider a dining-hall for, say, thirty term boarders. A good disposition will be three tables for ten scholars each, and a fourth table of like accommodation, as there may be day-boarders and occasional visitors to dinner. Each of the three tables for boys would have a house-teacher or a monitor at its head, and the

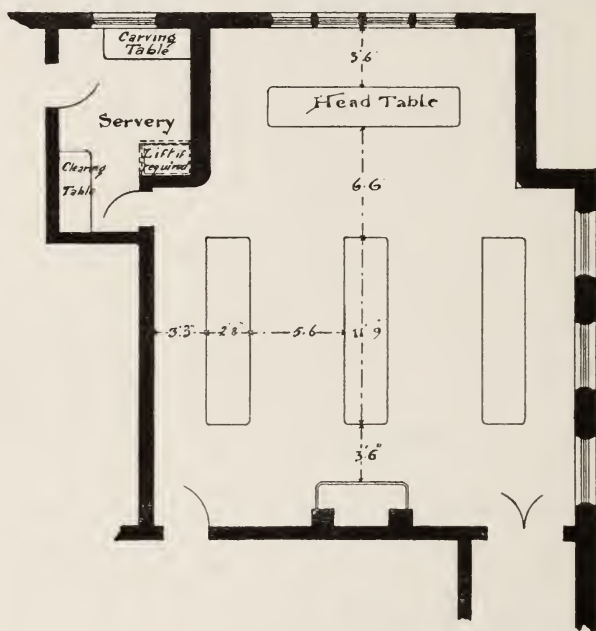
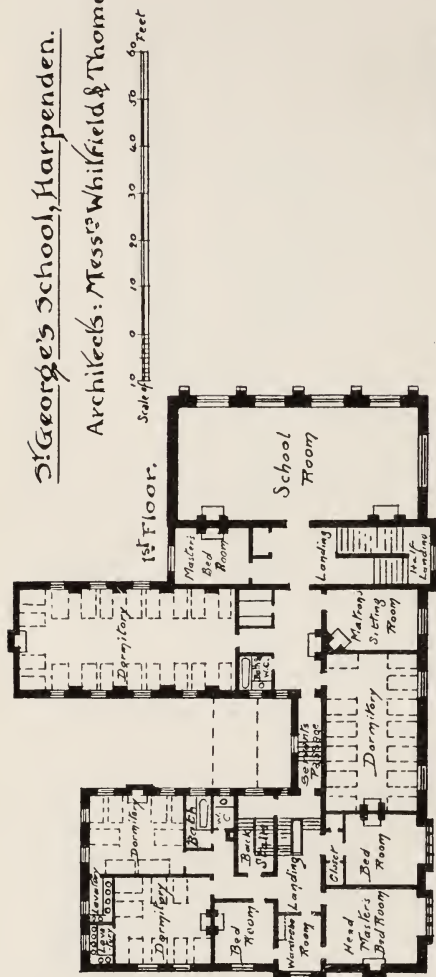


FIG. 14.—PLAN OF SCHOOL DINING-ROOM.

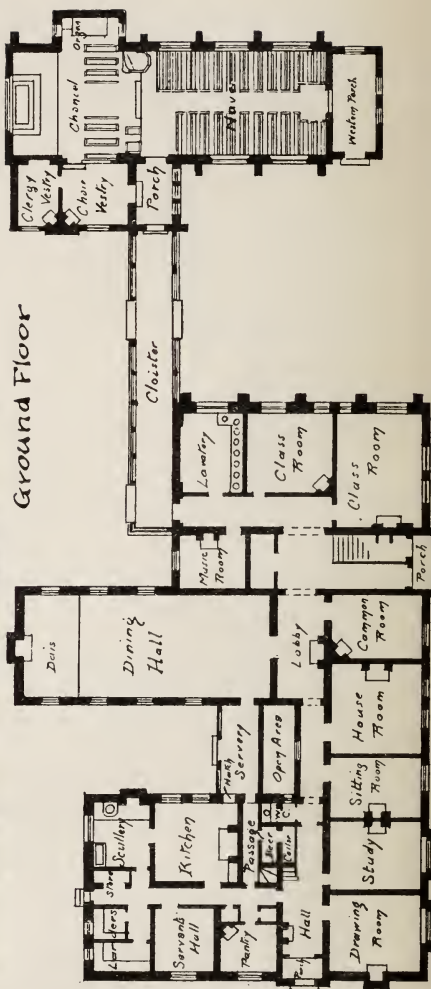
top table would frequently be used by the Principal and family. Each scholar should have as seating space 2 ft. width by 1 ft. 3 in. depth, and as table space a depth of 1 ft. 4 in. calculated to the centre. For the teacher at head of table 1 ft. 6 in. depth of table and 1 ft. 6 in. depth of seating should be allowed, and the same provision should be calculated at the foot. Ten scholars at the board will give five on either side, when a table is thus obtained 13 ft. by 2 ft. 8 in., and a floor area 16 ft. by 5 ft. 2 in.

St George's School, Harpenden.

Architects: Messrs Whilfield & Thomas



Ground Floor



2 ft. side and 3 ft. central gangways are necessary for service, to which must be added the seating accommodation. The additional table is frequently set on a dais raised 6 in. above the level of the rest of the room, but this is to be deprecated, as the step serves to form a tripping place for causing dishes to be upset. The room as figured in the accompanying sketch (Fig. 14) would, as a matter of theory, accommodate forty diners in comfort ; but in practice half-a-dozen more would probably be seated.

A servery is a useful adjunct, and is shown on the same sketch.

The covered playground (or cloister) for use in inclement weather should have a low shelf sufficiently long and broad to accommodate all the play-boxes.

The teachers' common-room should be large enough to take a small table, some half-dozen chairs, and a small bookcase.

A school, by Messrs Whitfield & Thomas, is shown on Plate LI.

Schools, Science and Technical.—The particulars and requirements will be a modification of those noted for "Polytechnics." *

Shops.—See under "Business Premises."

Stables.—See under "Outbuildings."

Technical Institute.—See under "Polytechnics."

Theatre.—(*a.*) Accommodation for actors, musicians, and the public ; acoustic and optical requirements ; efficient and sufficient entrances and exits ; special bye-law requirements.

(*b.*) Stage and accessories, green-room, dressing-rooms, manager's room, stores, stage-box, orchestra, retiring-room, W.C.'s and lavatories, auditorium, en-

* See Appendixes C and D.

trance-hall, box-offices, crush and cloak rooms, tiers, boxes, foyer, refreshment-bars, exits and entrances.

The basis of accommodation is the seating area per individual :—1 ft. 8 in. by 1 ft. 10 in. suffices for gallery and pit ; 1 ft. 10 in. width by 2 ft. 6 in. depth for first and second tiers ; whilst stalls should have more generous allowance, about 2 ft. 3 in. by 3 ft.

In estimating the accommodation per individual for an approximate total calculation, all gangways have to be included, and on this basis not less than 7 ft. super. should be taken as the unit. Thus with an auditorium of say 13,300 ft. super., 1,900 spectators could be accommodated on the floor area alone, the tiers being of course extras on the above.

Boxes should be capable of holding five or six people comfortably, though the habit of placing them at the extremities of the tiers instead of centrally is open to objections.

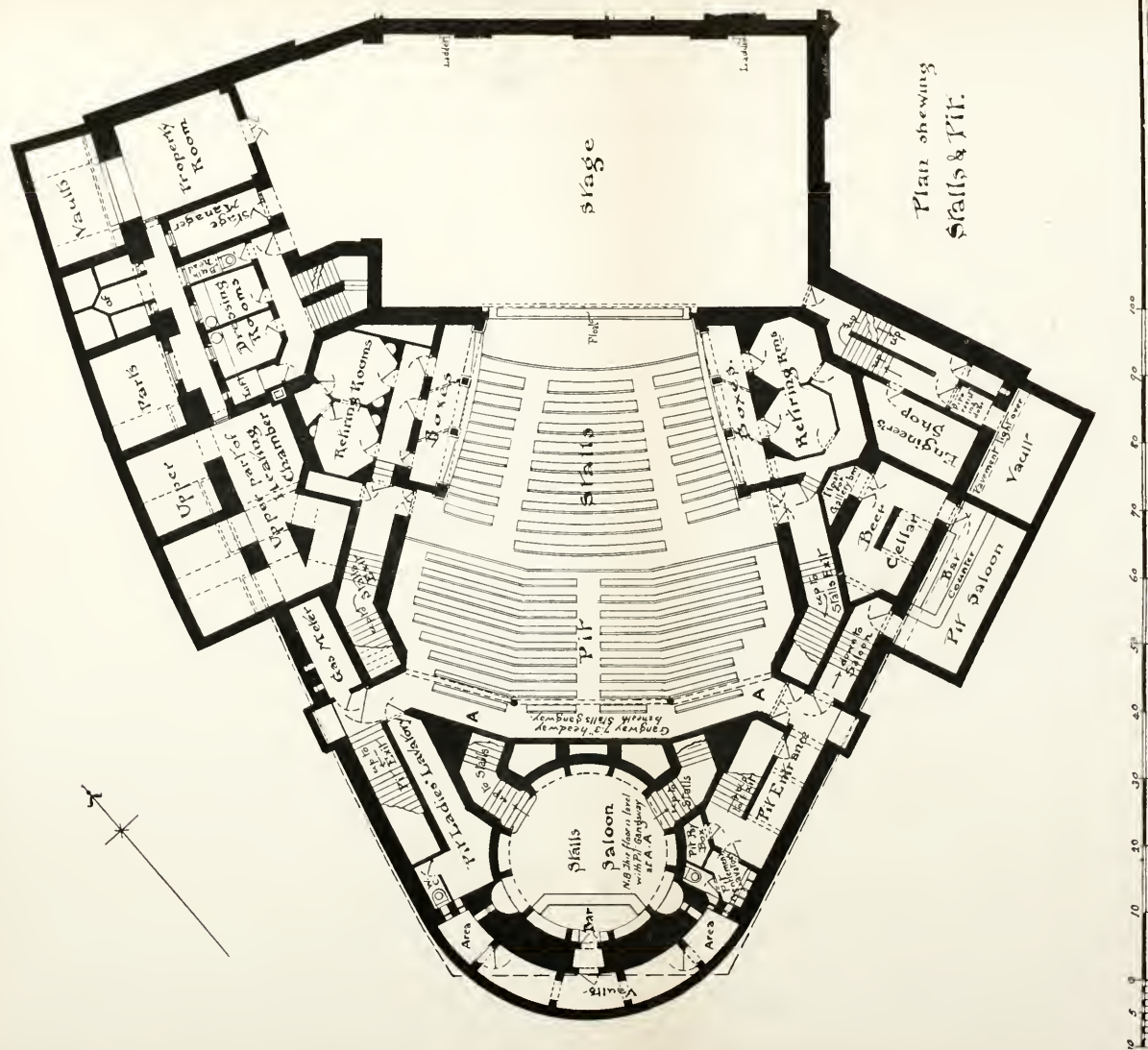
The entrance-hall and crush-room should be as large as can be conveniently managed ; and the entrances to the hall from the street and from the interior approaches must, in London, be in accordance with the County Council Bye-laws. It would be an advantage if similar regulations as to places of public assembly were enforced generally over the country. The scheming of a metropolitan theatre is by no means an easy matter since this Council came into being, and stringent as its regulations are, yet it is a wise severity. The bye-laws issued by the L.C.C. are given in Appendix B, at the end of this work.

For plans of a metropolitan theatre by Messrs Runtz & Ford see Plates LII. and LIII. ; and for a provincial theatre by Messrs Owen & Ward see Plates LIV. and LV.

Town Hall.—See under “Municipal Offices.”

Village Club and Hall.—(*b.*) Hall, platform, artistes' rooms, reading and billiard rooms, vestibule and pay-box, refreshment-bar, W.C.'s, lavatories, and cloak-rooms, committee-room, etc.

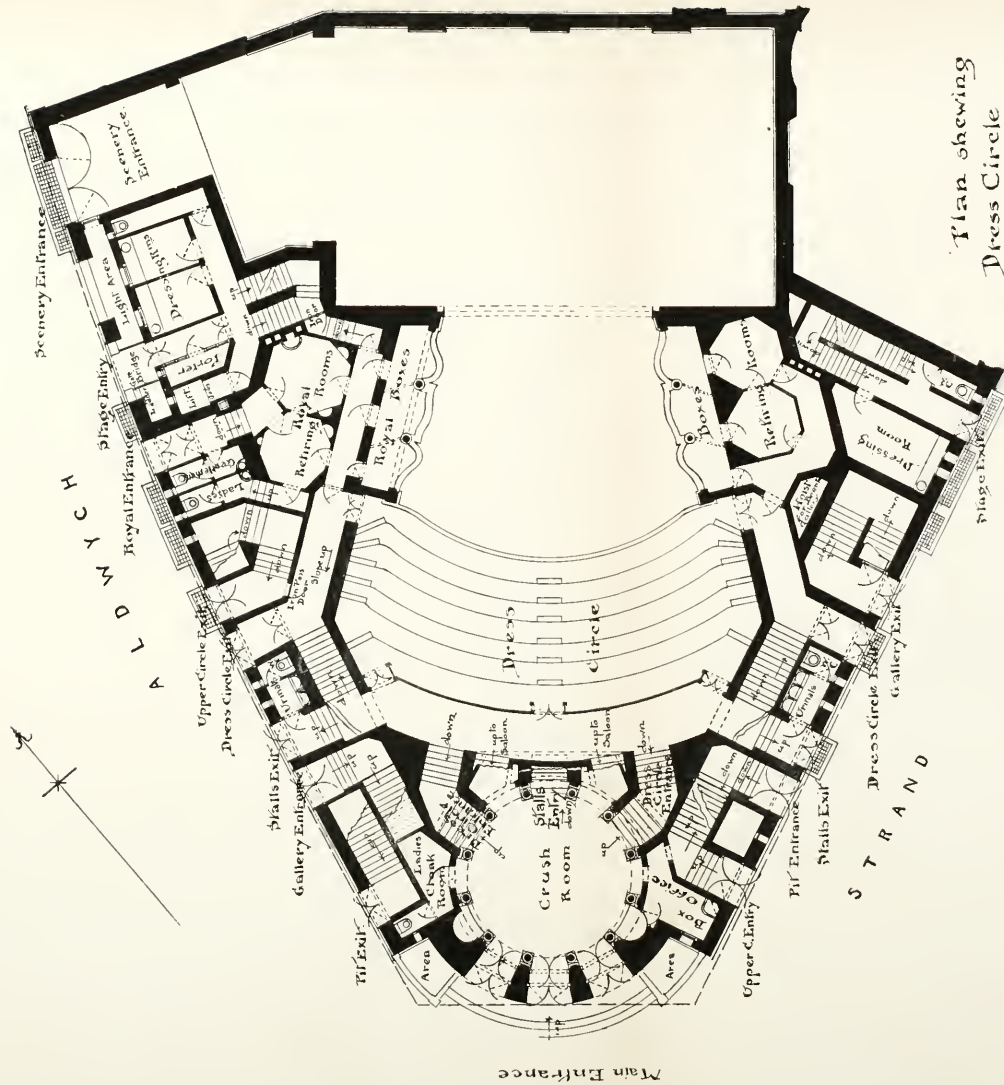




THE NEW GAITY THEATRE: STRAND, LONDON.

Architects—ERNEST RUNTZ & FORD.
(See also next Plate.)





Plan showing
Dress Circle

THE NEW GAIEY THEATRE: STRAND, LONDON.

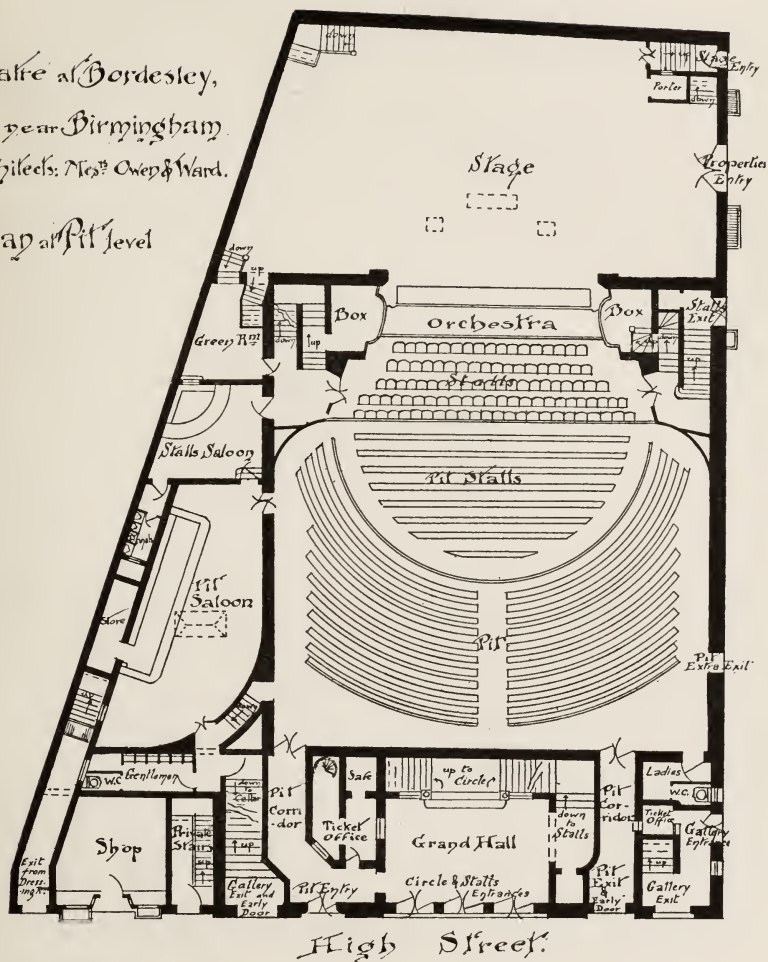
Architects—ERNEST RUNTZ & FORD.
(See also previous Plate.)



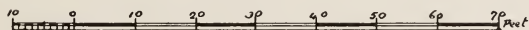
Theatre at Bordesley,
near Birmingham.

Architects: Messrs Owen & Ward.

Play at Pit Level



High Street.



Theatre at Bordesley.

See also preceding Plate

Play at Circle level

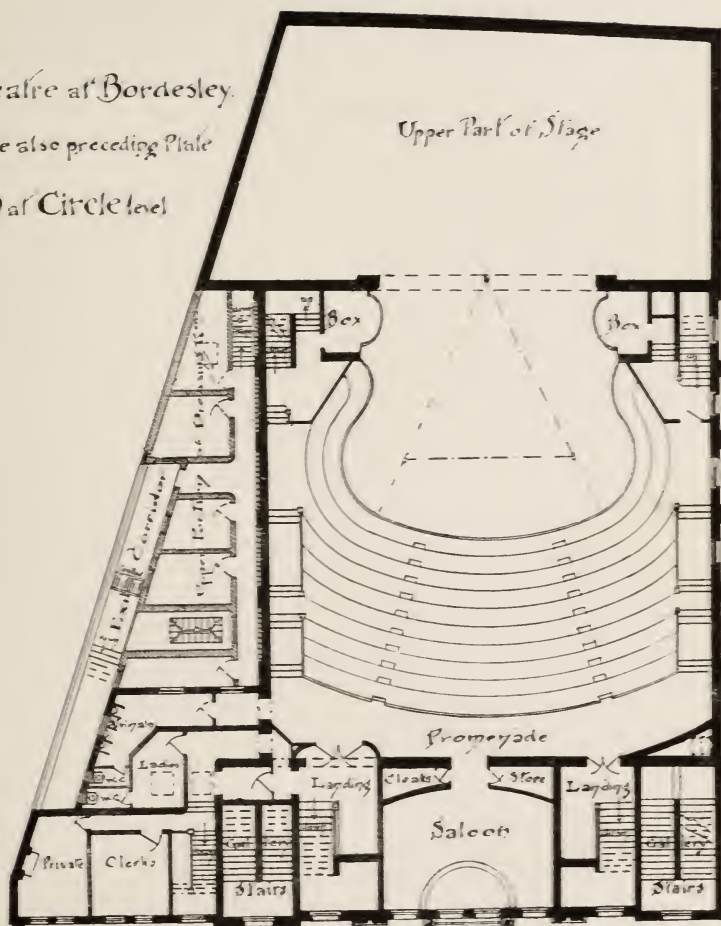
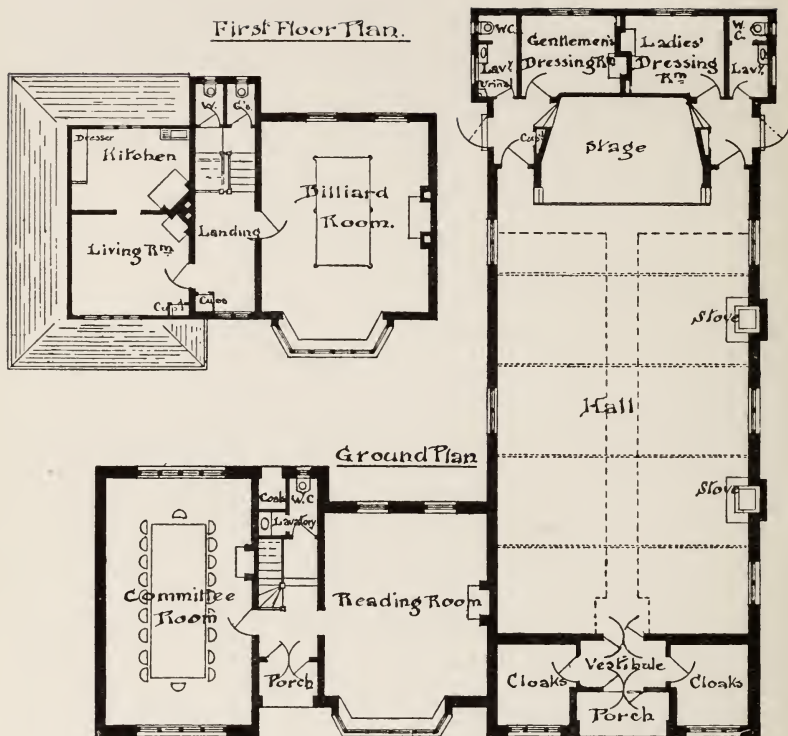
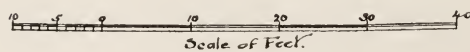


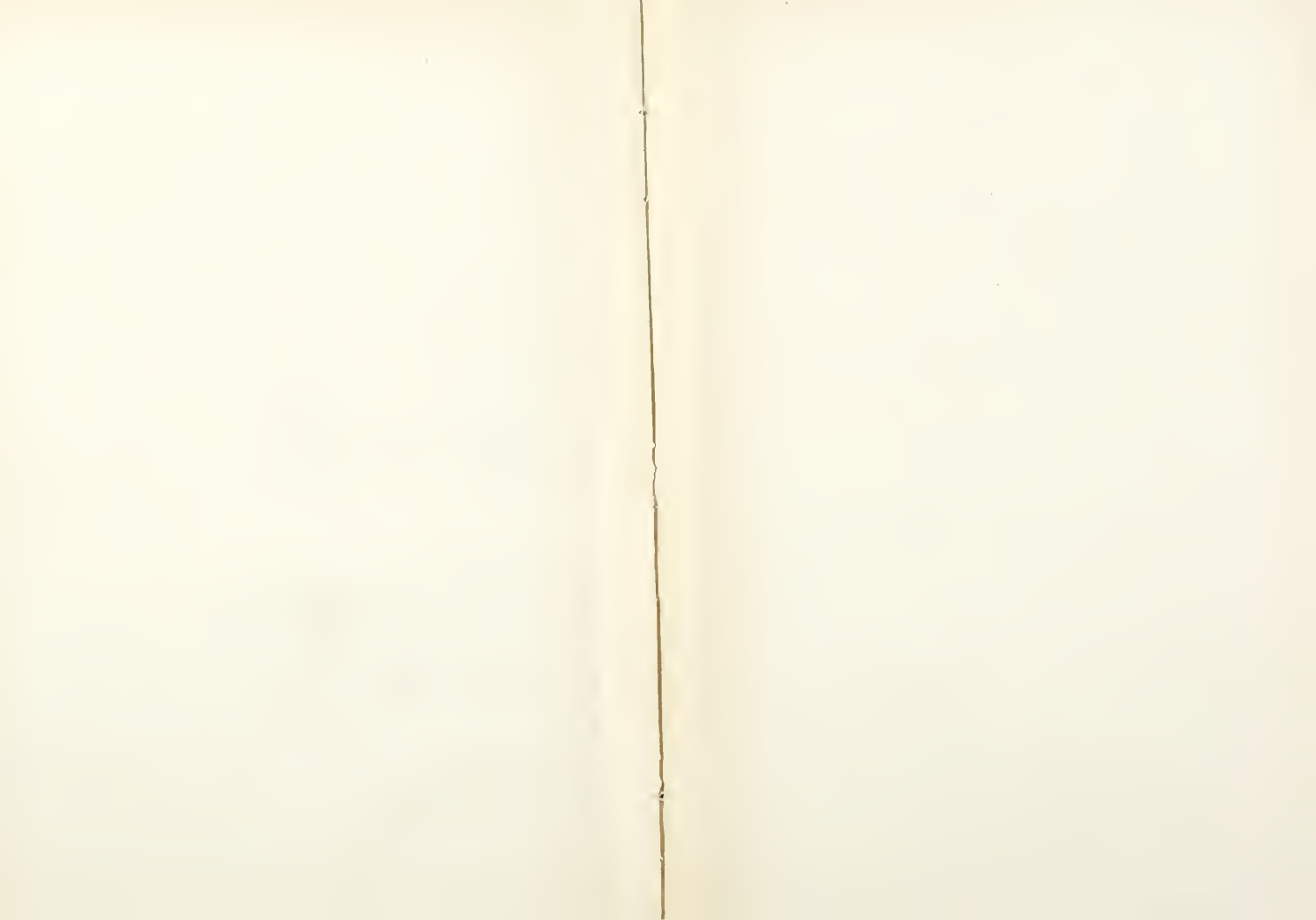
Plate LVI.

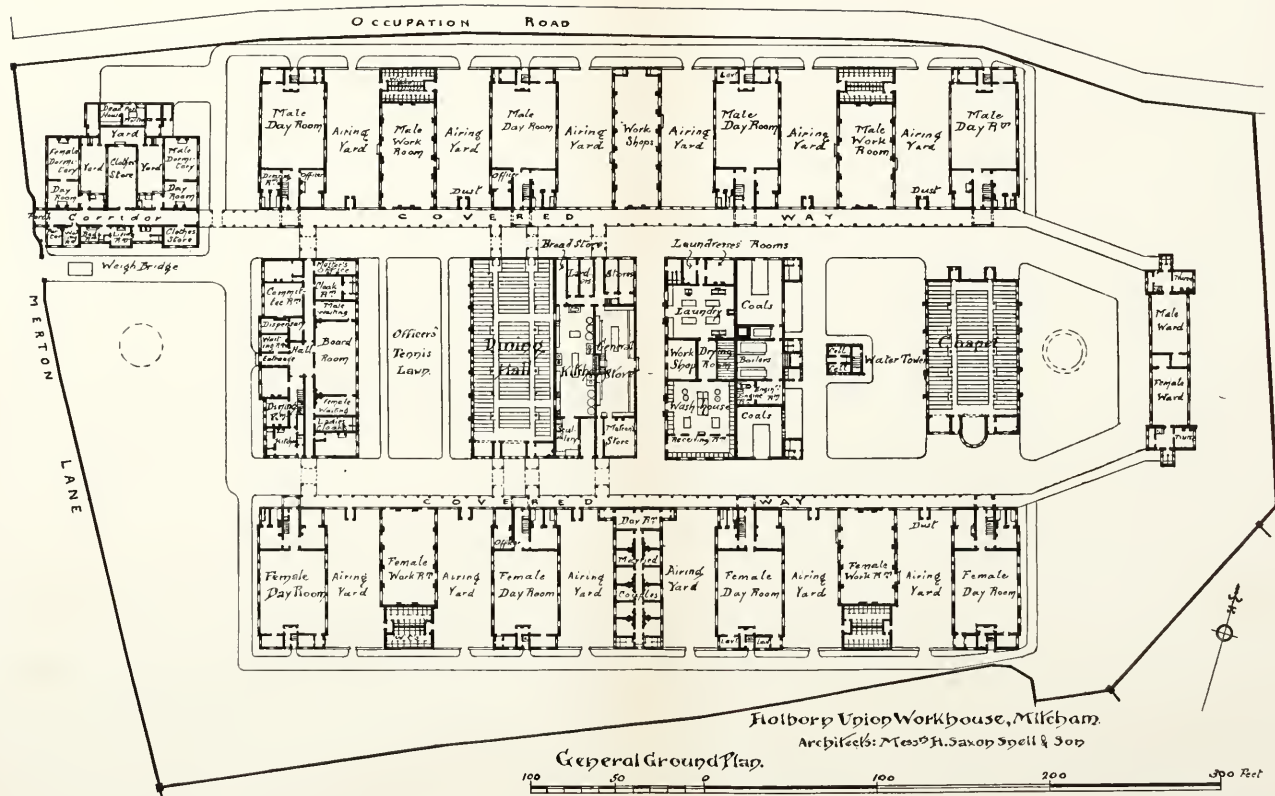


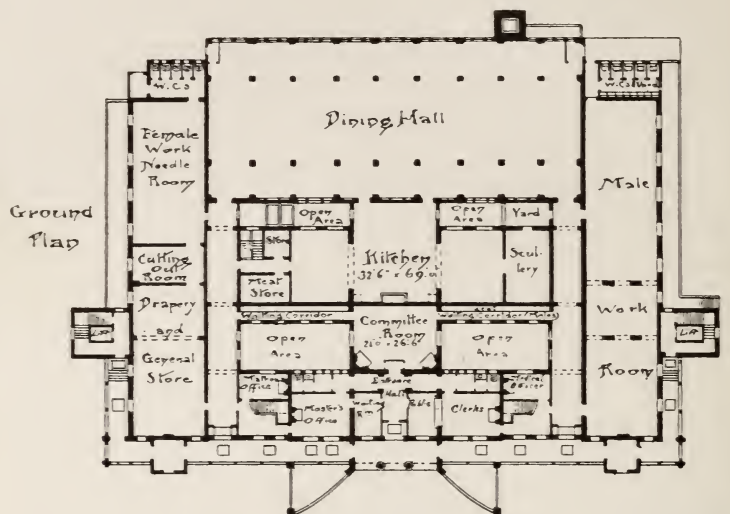
Proposed Village Hall & Club Byfleet.

Architects: W.F. Taylor & Son, A.R.I.B.A.



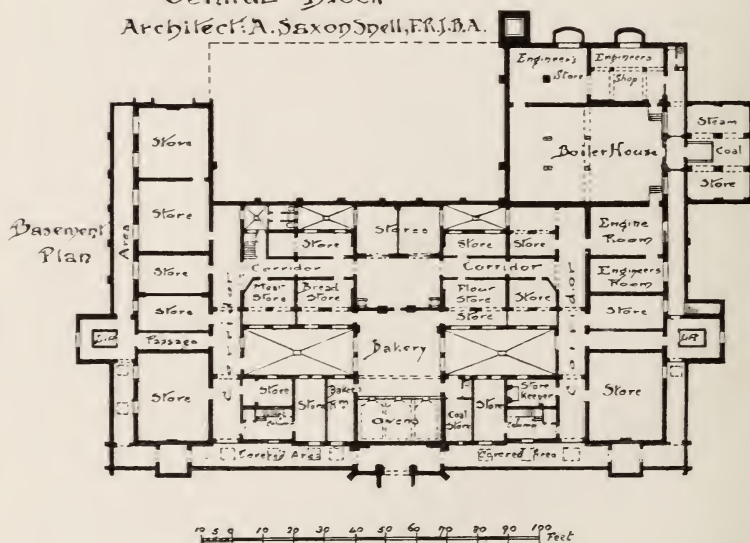


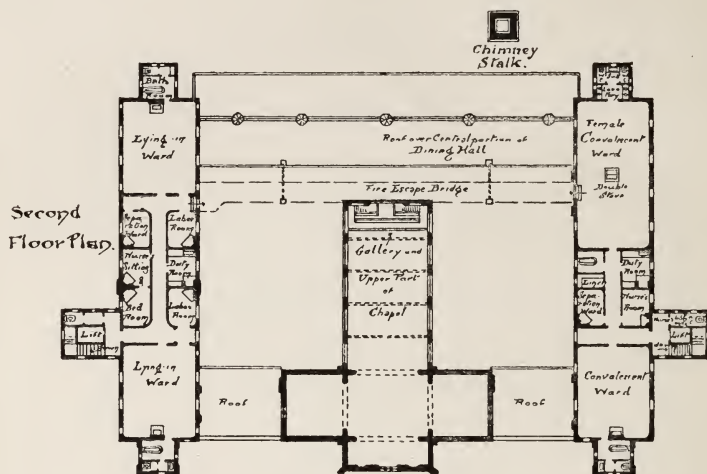




St Marylebone Workhouse.
London.

Central Block
Architect: A. Saxton Spell, F.R.I.B.A.

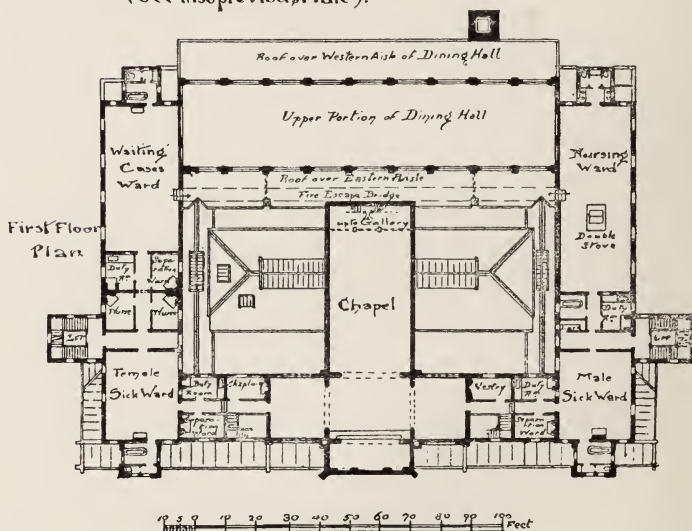




Marylebone Workhouse.

London

(See also previous plate).



Plans submitted in competition by Messrs W. F. Taylor & Son are shown on Plate LVI. The hall there shown was to accommodate 150 persons.

Warehouse.—(*a.*) Unencumbered floor space; avoidance of open staircase-wells.

(*b.*) Various floors for warehousing, offices, delivery and packing rooms, lavatory and W.C.'s, etc.

Workhouse.—(*a.*) Central administration, grouping, lighting, economical planning, classification of inmates.

(*b.*) Receiving and discharging wards, common dining-hall, day-rooms, workshops, airing-yards, dormitories, washing-rooms, chapel, dispensary, laundry, stores, lying-in wards, etc., imbecile and casual wards, superintendent and matron's rooms, committee-room, doctor's room, kitchen, etc., out-relief department (containing waiting and consultation rooms, etc.); panic staircases.

A plan showing the general disposition of a workhouse, by Messrs H. Saxon Snell & Son, is given on Plate LVII., and on Plates LVIII. and LIX. are given plans of the central block of St Marylebone Workhouse, London, by Mr A. Saxon Snell.

In the dormitories, 54 ft. super. space per inmate suffices, and the washing accommodation should preferably consist of a range of lavatory basins in an adjoining compartment. There should also be foot-washing troughs.

It is worthy of consideration whether the dormitories should not be divided into cubicles, in which case a washing-basin would naturally be fixed in each compartment, and thus each cubicle would be self-contained. However, if this be deemed too great a reform generally, it should certainly be a provision for the deserving inmates of the poorhouse. The merits of classification of inmates are now recognised by the Local Government Board, and many desirable and interesting modifications

in planning will thus be effected. Cottage homes and boarding-out for pauper children will have the same effect. The Local Government Board requires in cottage homes 300 cub. ft. bedroom allowance per child; in small "block" homes (for about fifty children) the State requirement in the dormitory is 360 cub. ft. per child.

The ethics of the subject are beyond the boundaries of the architect's consideration professionally, and therefore (beyond remarking that every discouragement should be placed in the way of people, to prevent them from becoming paupers, and that the deserving inmates, who have become paupers through misfortune, should receive beneficent and home-like treatment) the strict record of this manual will be maintained.

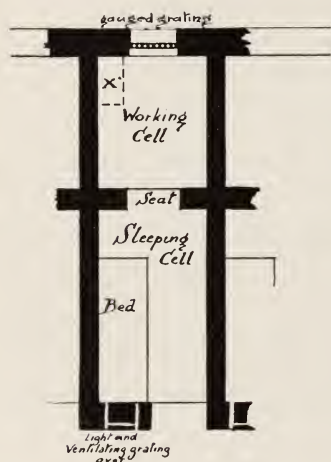


FIG. 15.

Casual Wards are provided for the reception of tramps who want a night's board and lodging. In return for this, a modicum of work is required. This sometimes takes the form of oakum-picking, which can be effected in the sleeping-cell; women are sometimes given charring work as their portion instead

of oakum-picking. Frequently, however, the men are required to break stone, in which case separate cells are necessary. The sleeping-cell may be about 8 ft. by 4 ft. 6 in., giving entrance to the working-cell, about 5 ft. 6 in. by 4 ft. 6 in.; the latter has a gauged grating for the passage of the stone when broken.

The sketch appended is the form of cells adopted by Messrs Snell in one of the London Workhouses. The level of working-cell is lower than that of the sleeping-cell, sufficient to form a seat at entrance into former. It is advisable to have the floor lower, but a better position for the seat would be at X near the gauge. Bath-rooms, attendants' and waiting rooms, are also required.

Modern ideas tend to eliminate so-called degrading labour from workhouses, and stone-breaking is frequently included in this category. When these ideas prevail, the planning of these buildings will be to an extent modified.

In workhouse infirmaries throughout the kingdom, the number of patients is seldom allowed to exceed 600 ; the cubical space required per patient varies from 600 ft. for ordinary infirmary cases to 960 ft. for offensive cases ; in the metropolis, the respective figures are 850 cub. ft. to 1,200 cub. ft.

On the female side, special wards in the infirmary are required for lying-in cases, and they must be planned with as much care as the infectious wards of hospitals, but should accommodate a smaller maximum number of patients than the latter customarily provide for.

It may be noted that the provision and requirements of workhouses and their infirmaries in the United Kingdom are subject to the regulations of the Local Government Board.

Finally, the reception of imbeciles in workhouses is under debate, as it is by many considered to be injudicious ; at present, however, the law demands their reception ; but this and other matters, such as classification of inmates, are receiving the sympathetic consideration of the Local Government Board.

CHAPTER IV.

ASPECT.

ALTHOUGH ASPECT is of very great importance, its treatment need not as a rule prove difficult ; and with due observance of the necessity of yielding on small counts, and of maintaining essentials, it is perhaps the least worrying of all the points (except Prospect) that have to be studied in the planning of a building.

In considering Aspect, it is a question of regulating the admission into any room of more or less sunshine ; rarely is light *quâ* light the object of attention, and for the present at least the latter may be disregarded.

Every one should know primarily that the motion of the Earth gives the effect in the Eastern hemisphere of the sun rising in the East, proceeding Southwards till noon, and setting in the West. And were this knowledge the utmost attainable, many defects in planning could be forgiven ; but as it is possible to calculate for windows in all positions and throughout the day, there is but little excuse for excessive disregard of Aspect. Briefly stated, it is well known that

* On 21st Mar. (Spring Equinox), the Sun rises at 6 A.M. and sets at 6 P.M.			
On 22nd June (Summer Solstice),	„	3.45 A.M.	„ 8.15 P.M.
On 23rd Sept. (Autumn Equinox)	„	6 A.M.	„ 6 P.M.
On 22nd Dec. (Winter Solstice),	„	8.15 A.M.	„ 3.45 P.M.

This is still in reference to the Eastern hemisphere.

If the mariner's compass is set out, and these positions are marked and noted as above, all the customary radials being set out, together with any required window, it will be possible to estimate the duration (in hours) of sunshine entering, if unimpeded by obstructions. So far distant is the sun from the earth, that to attain an approximately correct result, any desired

* These dates are approximate.

window must be set centrally in the diagram, as can be readily understood. By this means it can be established, that taking a window of average size and set flat in a wall which faces—say—due North, there would be but a stray beam of early and late sun at the very height of summer. This might be considered welcome at the time, but in the winter such a window would produce very trying conditions in the total lack of warmth from the sun's rays, and more harm might accrue under the latter circumstances than there would be good effected by the summer coolness. This method of calculating the amount of sunshine is fully set forth by Professor Kerr in one of his books, and an explanatory diagram accompanies the text.

The maxim in regard to Aspect is:—Get all one wants out of the sun, and then give him his *congé*. This should certainly not prove a difficult procedure, as the principle exemplifies a well-known phase of human character.

It is natural to consider Aspect as gaining its chief importance in the planning of domestic buildings, though it must also be taken into account in certain other classes of buildings, and a systematic consideration of such of those as have been dealt with previously is advisable. But those only will be mentioned where Aspect is likely to affect in any way the scheme of planning.

Art Galleries.—These should by preference be top-lighted; but if any side windows are introduced, they should face East to North. Pictures cannot be properly seen when the sun is shining on them and at the same time casting the spectator's shadow on the object to be viewed.

Art Schools.—The windows should face East to West *viâ* North in the class-rooms, so that nothing but diffused lighting may enter. A lecture theatre may have South-east windows, but anything more southerly should be avoided, as it would tend to make the room too hot in summer for comfortable use in the afternoon, and the soporific effects might indeed be pleasant but would not be profitable.

Assize and Law Courts.—The Courts may advantageously have a South-east aspect. Though for Breach-of-Promise Courts, principles for comfortable planning may be disregarded, yet in the Chancery Courts they are of very great importance so that no further inducements to slumber should be offered, than are provided by the legal causes themselves ; therefore the quadrant from South to West must be strenuously avoided here. The Library, too, should avoid the same quadrant, for the reason that the books are easily affected by a damp situation.

Hospitals.—The wards are considered to be advantageously set when their longitudinal axes are North and South, so as to obtain East and West windows ; but though there cannot be two opinions as to the value of obtaining the early rays of the sun, there may well be disagreement as to the advisability of introducing the westering rays into the ward, as they would prove trying to many of the patients, and would necessitate the drawing of the blinds to mitigate the nuisance. But with ideas at present accepted, East aspect implies the simultaneous use of West for hospital wards ; and this is but another example of securing the greater benefit, as there is more good to be gained from having East windows than harm would accrue from having West. A day-room (which is for the reception of convalescents) should have the maximum of sunshine, as elsewhere noted ; a sun-bath is an excellent specific.

Houses.—As above hinted, it is in such buildings as these that Aspect assumes its greatest importance, for it is in houses that people desire the maximum of comfort ; at any rate the majority do so, and legislation should be for the many and not for the few ; it is in their homes that people look for the comforts of life much more than in their business houses. Aspect is very largely a comfort provider ; it is requisite to a great extent from a sanitary point of view, but it is more to be considered from the other standpoint. First consider the question of bedrooms ; undoubtedly East is the best position

for windows, as by such means the earliest rays of the sun flood the room and lend a genial air sufficient to enable early risers to do their duty with some show of willingness, and when it is time to retire to bed the room is comfortably cool.

A Breakfast-room (which may often act as Morning-room) may be South-east advantageously, thus ensuring the early sun, and at the same time retaining it until about 11.0 A.M.

A Dining-room may well be provided with South-east windows, though if the room will be solely used for the purposes of evening dinner, South windows would be an improvement. A Drawing-room may be South-east to South. A Kitchen can comfortably get on without any sunshine later than East. A larder should face North for the maximum of coolness. A Study may be West if nothing else will serve, but by preference should be South-east; and as regards a Library, it should be anything between North-east and South-east. The hot sun would be an objection in these rooms, and where the storage of books has to be considered as in a Library, West is inadmissible, as it would but tend to promote mildew. It can be readily conceded that the best study is effected by a gentle circulation of the blood, and that an excess of either heat or cold is detrimental; of the two, the former is the worse, and would but incline a student to yield to the charms of Morpheus, when a more wholesome influence might possibly have been embraced. A Wine-cellar should be free from any aspect whatsoever, as it is a mistake to subject wines to the influences of external atmospheric changes.

School-rooms should be South-east or South-west, as these aspects give efficient without excessive natural heat, and the westering sun would not be trying, except during a very brief portion of the year, as school-hours usually conclude about 4.30 P.M. at the latest.

Billiard-rooms by preference should be top-lighted, and if receiving side-lights, should have either the whole side of one wall practically devoted to windows, or should at least have any one window immediately confronted by another of similar dimensions in the opposite wall.

Offices.—Drawing-offices and such like are preferably provided with north lights.

Shops.—Drapers', tailors', and similar shops are preferably treated for Aspect where the show-windows have a minimum of south sun on them, as the strong rays would serve to change the tones of the goods displayed. Frequently it is impossible to pay heed to this, but the principle holds good.

It might be noted at this place that means for correcting aspect exist in the provision of bay-windows, and this has a two-fold benefit. They will (1) provide sunshine for a room where otherwise the outer face of the wall alone would receive it, and



FIG. 16.—CORRECTION OF ASPECT.

(2) exclude the sunshine where undesirable, *i.e.*, they will act negatively as regards exclusion, by providing canted lights, where otherwise the direct rays would be unavoidable.

There are also other means of getting the upper hand of Dame Nature; daylight reflectors and refractors hold an important position in the business relations of a crowded city; these aids may take the form of glass, mirrors, or glazed brick facings. Sometimes the lowly whitewash is also utilised, and though at first these details may not seem to have any connection with planning, yet indirectly they may serve to stifle qualms of conscience where an architect obtains some "desirable offices" in his plan, suffering from an insufficiency of daylight.

CHAPTER V.

PRIVACY AND SECLUSION.

A LITTLE ingenuity will secure the necessary degree of Privacy or Seclusion under varying conditions, and these will now be considered.

A building (whatever its nature) may be excellently planned in other respects, but if it fails in this provision it is a deplorable error, unretrieved by its possibly numerous advantages. Privacy is of two kinds, as previously noted, viz., the privacy of one part from another, and of all parts from the public highways and byways. Both classes require the architect's earnest attention.

A note of warning may well be sounded here to guard against the hard-and-fast acceptance of any dictum; the Principle is always to be accepted, but should be practised with discretion; it is so easy to make a fetich of words, phrases, or formulæ; these should not be considered so much for their own sake, as in the light of means to produce a desired end.

It is to be remembered that Privacy and Seclusion are not convertible terms. The average merchant may desire to ensure that his own office is private, but would highly object to it in a secluded spot. But in considering the disposition of a Study or Library, seclusion is very desirable, so that such a room may be out of the line of much-used domestic thoroughfares.

Privacy can be secured by means of various expedients—(1) By the mode of hanging the doors; (2) by the provision of screens; and (3) by disposing the various parts of any building in their proper co-relation.

Consider primarily a room as shown in Fig. 17. The door being hinged to open as indicated in the room next the staircase would reveal to the eye of any one entering or of any

one passing (if the door is left open) the greater portion of the interior; but if hinged as shown in the opposite room, the due amount of privacy is obtained.

A very obvious contention at this place would be to suppose the door placed centrally along the wall of the room. In such a case, a great deal would depend on the relative position of window and fireplace; were the two confronted as shown in Fig. 18, the door would properly be hung as for A, and a different disposition is also indicated to suit different circumstances.

It is perhaps a moot point how the door should be hung in room A; but as the fireplace and window are not planned in proper co-relation, it serves to show how one misdeed may be the cause of others. However, accepting this position of each of the three

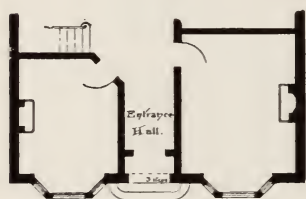


FIG. 17.—INCORRECT AND CORRECT DOOR-HANGING.

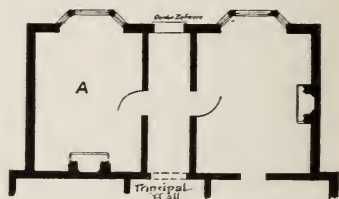


FIG. 18.—ADMISSIBLE AND CORRECT DOOR-HANGING.

features as a necessity from some one cause or another, then it may well be remembered that it is better to screen the fireplace from observation than the windows. If the exclusion of draught is not greatly dwelt on here it is only because it is scarcely the right place for it, but it may be borne in mind that it is better to sacrifice some privacy (if necessary) in order to obviate a draught.

There is an alternative mode of treatment of the above problem, but this solution is not always a desirable one, nor is it always possible, but under favourable circumstances it can be introduced effectively. The treatment consists in the provision of a small lobby either projecting into the room or the hall as shown in the sketches, Figs. 19 and 20. This not only secures the desired privacy, but lends an additional feature of interest

to the room or hall, and it is a great desideratum in schemes to introduce "features" as far as possible, so long as they possess a *raison d'être*. In the instances shown they would not rise to the height of main ceiling, but merely some 8 ft. or so.

If any people object (on the score of symmetry) to a door placed out of centre, they can balance an effective entrance with a sham, if conscience will permit it. Memory reverts to a house (in one of the Clubland squares) whose architect indulged in this symmetromania; and verily the passion for symmetry was at one time much in evidence, viz., in the brave old days of Louis le Grand, euphemistically termed *Dieu donné*, but (great sinner as

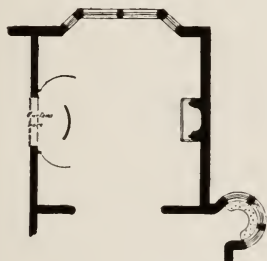


FIG. 19.
THE USE OF AN *Internal* LOBBY.

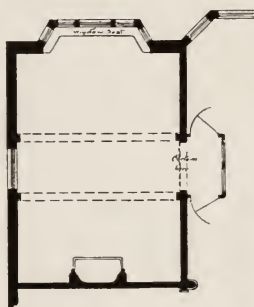


FIG. 20.
THE USE OF AN *External* LOBBY.

he was, on the score of pseudo-symmetry) he might well have been termed *Dieu abandonné*.

In regard to bedrooms, dressing-rooms, and bath-rooms, the bed, washstand and dressing-table, and the bath are respectively the objects to be primarily and effectively screened.

A case where privacy is easily obtained is where the desire is to screen the inmates of a house from the view of persons standing at the entrance-doors. The formation of a lobby is effectual, and though possibly resulting in the obstruction of some of the daylight, yet there would, in a majority of cases, be more to be gained by introducing than by omitting this feature. Where privacy is of supreme importance is with respect to water (and other such) closets, and it is a pity that this is so often

neglected in the planning of houses. The carelessness exhibited is indeed so continuous as to amount to callousness.

What more common than to find the half-space landing of a staircase as the entrance to the W.C.? Such a position serves to secure the least possible privacy and is utterly to be contemned; but no! it is necessary perhaps to modify the above statement, though it is better not to erase it; the least possible privacy is where the closet is *immediately* entered from a living or reception room; such were introduced in London even in the last century, though doubtless before the birth of the London County Council.

One instance of this defect occurs in the Town House (eighteenth century), built by Isaac Ware, for Lord Chesterfield; though this feature may have been removed when alterations were effected some years since.

At a meeting of the Architectural Association Discussion Section (1897-98) in connection with a paper on "Dodges," the provision of a W.C. (as in Fig. 21) was mentioned to the members. The passage shown gave entry to the garden, and yet was to be taken in as an integral part of the closet when the latter was to be used. An amusing instance, perhaps—certainly a curious one—but not to be repeated.



FIG. 21.

It is very often difficult to find just the right position, but that is scarcely an argument in favour of utilising the worst.

To explain this, consider such a house as shown in Fig. 22. This is an actual copy of the plan after which a terrace of London houses is built, and while commanding a high rental, does not provide a proportionate amount of comfort as compensation. As an illustration, Fig. 23 shows an amended mode of planning this wing. The same outside dimensions of site are maintained for the purpose. The restricted size made it perhaps a difficult problem, but yet not an unsolvable one. By the amended treatment, too, some direct side-lighting would have been obtained for the staircase, which under existing circumstances is very deficient in that respect.

Were it always possible, it would be very desirable to reach the W.C. through a cross-ventilated lobby, leading of course

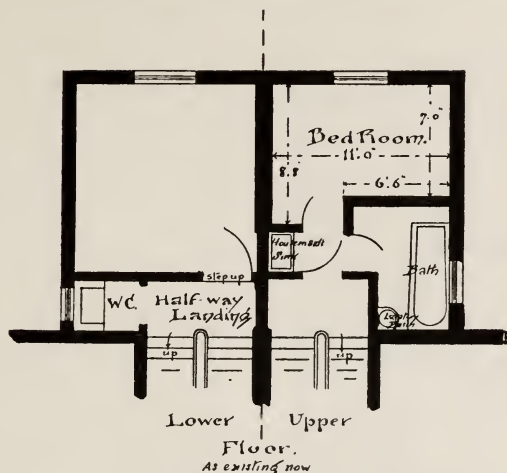


FIG. 22.—BAD POSITION OF W.C.

from a passage, not from a room. However, this is perhaps a luxury reserved for hospitals, infirmaries, and other buildings supported generally by ratepayers.

Having mentioned instances of how not to plan these offices,

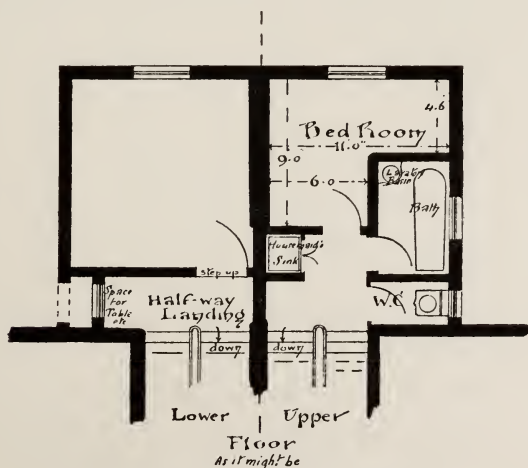


FIG. 23.—IMPROVED PLAN FOR FIG. 22.

it is only correct to give a contrasting example occurring in a number of terrace-houses built about thirty-five years ago (see Fig. 24). The houses generally are almost as well planned as

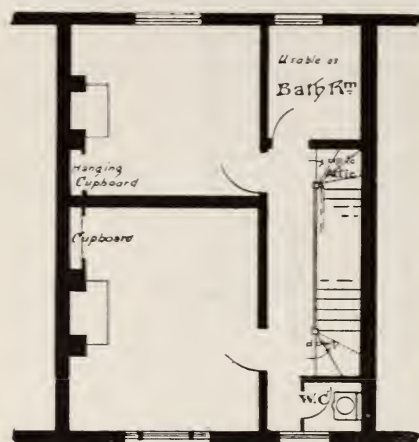


FIG. 24.—WELL-PLANNED BEDROOM FLOOR.

any of the size could be, and the one or two defects they possess are easily alterable.

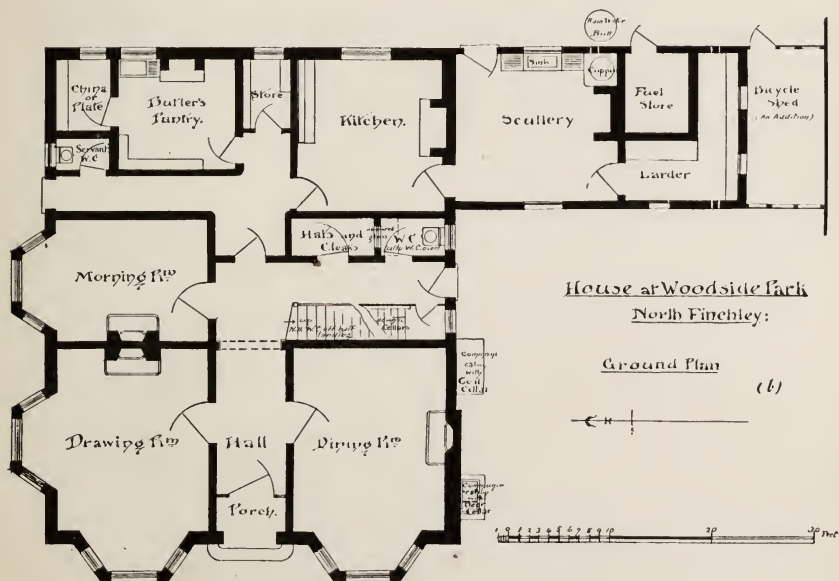
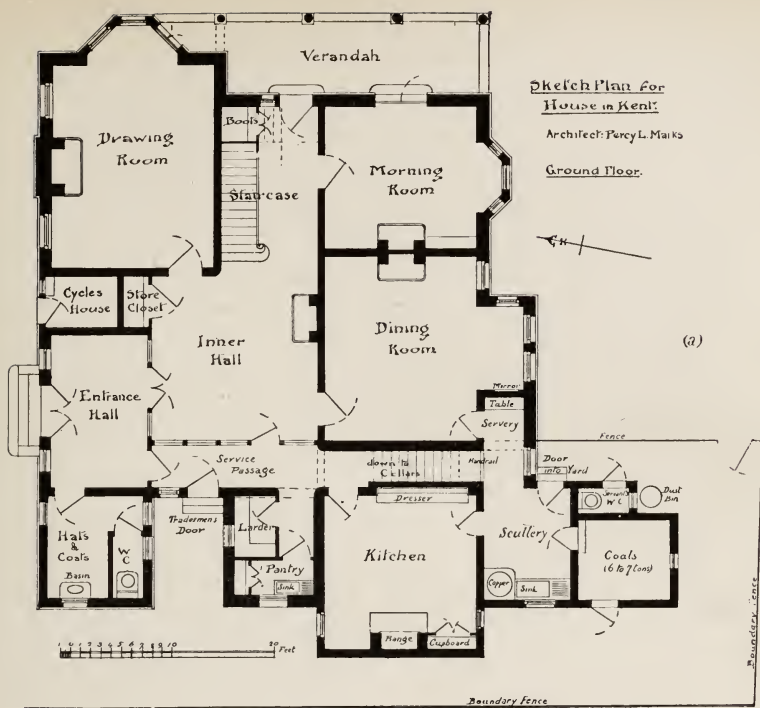
(3.) Privacy has also to be considered with regard to the relative position of one room (or set of rooms) to others. Thus, the kitchen department should be kept well out of sight and smell of the living rooms. There are different modes of effecting this.

(a.) The Kitchen and offices may form what is practically a distinct block, or (b) they may be at least effectually screened off, as shown in the plans on Plate LX. (the author has endeavoured to find out the name of the architect of the lower plan on that Plate, but has not succeeded in so doing). (c.) Then again, in another scheme, the result would be attained by keeping all this department on a different floor from that utilised for the living rooms, but this is not so desirable a method, as it is advisable to simplify to the utmost the service between Kitchen and Dining-room.

Privacy has also to be considered in the relation of Bath-room to others. It will be natural to treat the principal bedrooms most considerately in fixing the position of this office, but however and wherever planned, endeavour should be made to seclude it from the staircase. In very big houses, additional bath-rooms would be provided as noted earlier on page 45.*

Seclusion.—With regard to Seclusion, it is such rooms as

* See also Plate XXIX.



a Study or Library to which it would mainly be of advantage, and a position as indicated above for Library on Plate XXXIII. would form a possible solution of the problem. Seclusion is, however, of greater moment in buildings other than domestic. Thus in Banks, Government and Municipal offices, etc. etc., strong-rooms require this provision ; and in police stations, where a detectives' room is provided, this should not face a street but an inner courtyard, as any chances of familiarising passers-by with the personality of the detectives should be deprecated. Until recently, there were the regulation boots as a guide to the interested, but this does not come within the province of the architect. The cells also should be very secluded both for the sake of the public and the unfortunate occupants.

Another instance where seclusion should be considered is in the provision of caretaker's rooms in any building. The general public are not interested in the intrusion of such rooms in their midst, nor is it right to disregard the caretaker's claims for a proper provision of privacy.

In a large school building, the Principal has a great claim for due privacy and seclusion, and instances might be multiplied, but with very little benefit to the reader.

CHAPTER VI.

*ROOMINESS, FURNITURE REQUIREMENTS,
AND PROSPECT.*

IT may appear, on first consideration, as if it would be impossible to give to certain defined dimensions any appearance of greater capacity or any elasticity by structural means; and yet it is quite feasible, and serves to illustrate in extreme instances the difference between making the best and the worst of circumstances; truly it may be feasible to a small extent only, but where dimensions are restricted it is desirable to counteract the evil to the utmost. It is on a par with the mode of packing a trunk, that in the hands of a careless man will hold comparatively little, where an experienced traveller will pack his belongings so deftly as to cause surprise at the result.

“And still they looked, and still the wonder grew
That one small head could carry all he knew.”

The sentiment conveyed in this couplet of Goldsmith's may become applicable to buildings when properly treated, as well as to crania.

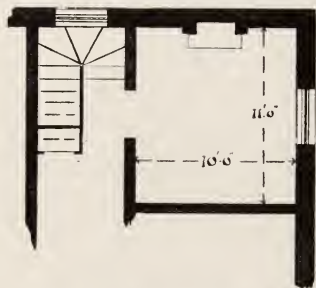


FIG. 25.—BAD POSITION OF
DOORWAY.

Leaving the realms of analogy, some instances may be dealt with as illustrations of what it is purported to convey. Consider an example such as is shown in Fig. 25; for the purpose, it is supposed there is a passage in the position indicated; this provides an easy solution of the problem “how to make the best of poor conditions.” Were the door to

be placed centrally, there would be about 4 ft. only on either hand, and this would be partially interfered with by the fire-

place accessories, rendering about one-fifth of the room useless for seating purposes from this cause alone, and it is serious when the obstruction due elsewhere to furniture is remembered. If the door were placed as shown in Fig. 26, only one-ninth or one-tenth of room is thus obstructed.

Consider also the fireplace. In such a room, the obstruction caused by the chimney-breast could well be dispensed with, and the requisite chimney space would preferably be provided either in a greater projection in the adjacent room, or (if the wall be an external one) by means of an external break. The window in a small room is better treated as a sash than a casement, except the latter open outwards.

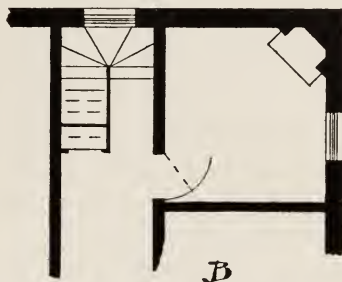


FIG. 26.—GOOD POSITION FOR DOOR.

Small rooms should also not be made inordinately high, as it but tends to produce a cavernous appearance. In a room of the dimensions just given, the height should not exceed about 8 ft. 6 in., otherwise the apparent size of the room is diminished.

The object, therefore, in keeping small rooms of a low height is to cheat the eye, whilst the other points are for actually making the most of disadvantageous conditions.

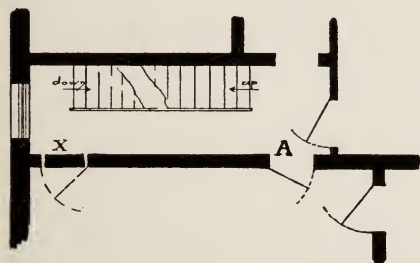


FIG. 27.—BAD ARRANGEMENT OF DOORS.

Further, it is possible to make greater use of a restricted area in any room by hanging the door so as to open outwards, but this expedient is not to be indulged in lightly.

While on the subject of doors in relation to roominess, it is well to call attention to a too frequent error that occurs in plans; this is the concentration of doors, as shown in Fig. 27: here the

door A could as easily have been placed at X, and the result would have been satisfactory. If this point is of importance in houses, it is even more to be considered in business premises. In the latter class, it is to be noted that doors may advantageously be hung double, one leaf to open inwards and one outwards. If in the furnishing of small rooms, people would but recognise the value of circularity as opposed to angularity, the benefit would be great.

The subject of *Furniture requirements* has been discussed elsewhere under the heading of approximate dimensions, but it is well to write a little more about it.

Mankind often learns more *savoir faire* by failing at times to satisfy its demands than by casually succeeding. This has been proved sufficiently to make prolonged comment needless. And though it is advisable to advocate the due consideration of furniture in planning a room, yet so seldom is this accorded, and so often is the casual success above noted, due to the excess of floor space unwittingly obtained, that it will probably be necessary for the majority of architects to suffer badly on some occasion before recognising the merits of this contention.

One instance brought to recollection by discussing this point is a house possessed of every external charm that eye could wish. On entering, however, and endeavouring to arrange for the disposition of the furniture with a view to taking possession, there was found to be an utter disregard (on the part of those responsible for the planning) of the necessity of furnishing a house. Many of the rooms were absurdly small, even for the circular furniture advocated elsewhere, and where there were some of respectable dimensions, there was a superabundance of window area not to be tolerated, and rendering the satisfactory disposal of furniture a matter of great difficulty. Of course the house has found tenants on different occasions, but how they could live there is a mystery, and what the duration of their various occupancies, the writer knows not.

The root of the matter is that an architect should not deem any point too trivial to claim his attention.

It has been previously noted that Drawing-rooms could not

well be planned on the basis of furniture, and this of course is true, as it is difficult to do more than generalise as to the contents of such a room. People who are satisfied to inhabit very small houses frequently possess a grand piano of trapezial form, and provision may be needed for a settee or two, a dozen (or so) chairs, some cabinets and tables; it is, however, guess-work, unless a client specifies for what furniture his drawing-room is to be built. With a Dining-room, it is possible to deal; for in the process of arranging for an average number of diners, the treatment for furniture falls into line.

A Library has to provide room for book-shelves (preferably cased), a central table, some half-a-dozen chairs, etc.

Other rooms are sufficiently dealt with earlier, under the heading of approximate dimensions.

Prospect (by which term is understood the view of some notable, pleasant, or redeeming feature in a given outlook) may be described as a luxury for the wealthy, and as a necessity for the less worldly favoured. It is generally accepted as an axiom that many a crime is traceable (indirectly it may be) to the protracted monotony of a dull and dismal outlook; outside influences form a powerful factor in human affairs, and ought to be reckoned with, and those people should be primarily considered who are not strong enough to resist the effect of external influences, in preference to others who are less weak-minded among the children of men. It would not do, however, to sacrifice too much for the sake of even a good Prospect; but under ordinary circumstances it is possible to give due prominence to this requirement. Of course it can be well understood how valuable are projecting windows for the purpose. The modes of treatment are numerous, and many of them very effective both internally and externally; but one variety sometimes used is to be deprecated. Strictly it is not bay treatment, but has the effect, and at the same time gives a weak appearance to the angle of the building, for which the neatness of treatment as regards the window itself does not adequately compensate (see Fig. 28).



FIG. 28.

CHAPTER VII.

GROUPING, ETC.

GROUPING consists in giving due proximity to parts more or less intimately related. This demands serious attention, and not infrequently receives it successfully. Perhaps the reason is that it more feelingly appeals to both client and architect as members in common of the general public who can appreciate the proper "grouping" of rooms or departments, where the due provision of other desiderata might be taken as a matter of course, or even where the lack of them might be unnoticed.

An architect may have calculated to a nicety the aspect of the various rooms; he may have secured due and fit privacy, pleasing seclusion and charming prospects, commodious rooms and pretty elevations, but this is not sufficient. The privacy, the aspect, the seclusion will be ignored. The prospects and elevations will be admired, the size of the rooms will call forth expressions of gratification; but if the grouping above referred to has been disregarded, vials of wrath will be poured upon the architect, and other benefits will be forgotten. It would be useless for him to say that the plans had been approved by the client; and so the better way is to avoid the error by timely consideration.

The most elementary instance of grouping may be taken to be the relation between Kitchen and Dining-room. There are three objects to be considered here—(1) A short transit, so as to minimise the cooling of hot dishes; (2) the prevention of odorous (or inodorous) communication between Kitchen and Dining-room; and (3) seclusion of service from the view of guests or callers.

Cases are numerous where (to obtain a short transit) the two rooms have been contiguous, and moreover have had a

communicating dinner-hatch in the hall. Though this provides the shortest possible transit and gives seclusion of service to a great extent, yet it is to be deprecated entirely, as the communication of kitchen-odours would be of a maximum intensity.

Cases also are numerous where (to prevent this trouble about odours) the two rooms are widely separated. This, too, is a bad expedient, promoting the lukewarmness in food which is so objectionable, and its necessary reheating, which is considered almost equally unpleasant.

There is, however, a very simple expedient in houses where the two rooms are on the same floor, and this is illustrated in various plans, and more specifically on the accompanying sketch, Fig. 29.

Where the Dining-room is on a different floor to the Kitchen, it is well to provide a small dinner-lift. There is not any objection to the latter opening into the Dining-room, provided it does

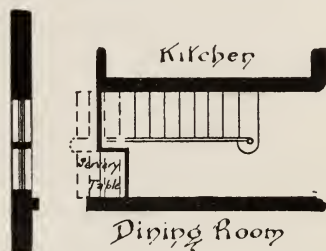


FIG. 29.

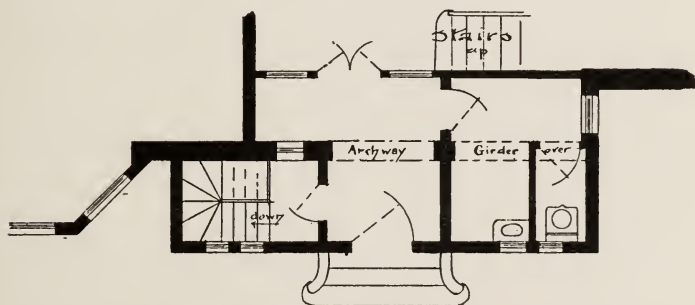


FIG. 30.—PLAN SHOWING SERVICE TO ENTRANCE, WITHOUT PASSING THROUGH HALL.

not communicate at its origin direct with the Kitchen. All these minute points require attention at the hands of the designer, and so become a matter of habit, if cultivated carefully.

Other cases of desirable grouping have also to be noted, such as easy communication between the Servants' hall (or such room

as answers the same purpose) and the front entrance ; if this communication can be arranged so as to avoid passage through the entrance-hall and principal stair enclosure, it is an improvement. Some such arrangement as shown in Fig. 30 would be appreciated.

There should also be good inter-communication between the various Reception-rooms (this term is used here with the catholicity of house-agents' descriptions).

In a house of any pretensions there should be a well-considered course between Drawing and Dining rooms ; there is not anything worse than unmeaning zigzag. It may not be possible, except in good-sized houses, to obtain anything in the nature of a "processional," but a compromise can frequently be effected. It may be accepted as an axiom that in dwelling-houses the doors of different rooms should not align ; in suites of State reception-rooms it is another matter, but in private houses it only tends to destroy privacy and promote draught, and though ventilation is most essential, yet it must be provided in the right place.

Attention must also be called to the importance of keeping dinner-odours from the Drawing-room. This is best effected by interposing a passage between the Drawing-room and the Dining-room and Kitchen.

Another point to remember is the proper relative position of Bath-room to the various Bedrooms ; it is destined to be used in common by the occupants of the latter, and should therefore be disposed as far as may be possible equally get-at-able. It is altogether different in scheming W.C.'s. Where bath-rooms may be equally visible to all bedrooms, W.C.'s should be if possible screened from all ; that is to say, a degree of privacy is desirable for water-closets that would be quite unnecessary for bath-rooms. W.C. apparatus is not infrequently provided in the latter, but whether this is desirable or not from the point of view of convenience, it cannot be advocated on sanitary principles.

It should be an endeavour on the part of architects so to

dispose bath-rooms, lavatories, water-closets and housemaids' closets, that they are not situated immediately over the more important rooms and passages ; for though accidents may not occur in the first ninety-nine cases out of a hundred, yet in the latter it would be well that any mishap should take effect on the less important and more secluded part of the house.

So far the treatment of houses has been under consideration, but other classes of buildings provide for solution fresh problems of grouping.

In hospitals, workhouses, asylums, etc., the Administrative department is best placed centrally, for economy of service.

In dealing with large *Municipal buildings* it is an elementary principle to keep each department practically self-contained, but there is a further consideration : the various departments must be properly co-related. The Town Clerk's should be in close proximity to the Council-chamber, as there might be frequent references necessary during Council meetings to documents stored in this department. Committee-rooms may well be distributed through the building, so that one or other may be in close touch with some of the more important heads of departments.

Strong-rooms should by preference be grouped together in the basement, and it is as well that they should not be situated against external walls, so as to minimise the chances of a successful burglary. This arrangement secures at the same time the advantage of freeing more window space for other rooms. Staircases and lavatories should, on the other hand, be well distributed over the building, and should be well lighted and ventilated.

Where Municipal buildings are on a small scale (which is more frequently the case) the above points are much simplified. It is the principles, however, that must be grasped, and their application can then be managed and adapted. It may be noted here (even at the risk of possible repetition) that in these buildings corridors are advantageous and should be of ample width. If any doubt exist as to making them wider or narrower in any particular case, the extra foot or so of width had better be supplied.

Law Courts and Police Courts require careful treatment in regard to grouping ; the Court-house being the focus of administration, the private rooms of the chief functionaries should be close at hand, and Jury rooms especially should, if not absolutely contiguous, be provided with a private passage into the Court. Barristers' and witnesses' rooms (when provided) should also, if possible, be placed near the Court. Attention to all these points tends to make the difference between a thoroughly satisfactory and a mediocre scheme.

The communication between day-cells and Court should be private and secluded, and it is a good arrangement to bring the prisoner direct into the dock by stairs leading into the same, communicating with a passage beneath leading to the cells. This arrangement is indicated in plans given earlier.* When the general scheme does not permit of this, a private stair and passage should be provided ; this is due to the unfortunate prisoners, to whom all possible consideration should be accorded on grounds both of justice and pity.

In spite of the preceding remarks, it must be borne in mind that there is nothing worse than blind adhesion to the letter of any principle ; the spirit should be observed to the utmost, which is often quite compatible with giving *congé* to the letter. To take one instance : given a bedroom with two external walls, one easterly and facing a cemetery : the window should be inserted in the other wall, for the genial cheeriness to be ordinarily obtained from an east aspect would be more than counter-balanced by the incessant prospect of the "House of the Living" (as it is poetically described) ; it is a most perverse paradox that the feeling created by a constant view of man's last resting-place should be one of disquietude.

It is safe to assert that not any of the principles of good planning will bear infinite extension. There is a well-known natural law in regard to elasticity, and these principles might suffer seriously if the "elastic limit" were passed.

* See Plates II. and XL. and page 14.

A few words may fitly conclude this chapter, in regard to the relative importance of the constituents that unite in the provision of a satisfactory building of the domestic class, from the architectural standpoint. The order of merit may not answer in all cases, but in general will certainly be correct.

Privacy is of the first importance, and in a majority of instances *Aspect* should hold second place, followed by *Furniture Requirements*, *Grouping*, *Prospect*, *Economy*, *Roominess*, and *Corridor Treatment*.

In regard to *Design*, a few remarks will be found later which should suffice to indicate the close connection that should exist between it and the planning..

CHAPTER VIII.

STAIRCASES, INCLINED PLANES AND MISCELLANEOUS FEATURES.

IT cannot be contended, that the mode of staircase provision need form a guiding principle in the planning of interiors, though the total omission of this feature has, on sundry occasions, been a theme for scoffers, and not entirely without reason. Nevertheless, there is great merit in a well-planned staircase, and there is considerable misery in the tenancy of a building where this feature has been treated perfunctorily.

That the staircase is the customary means employed for intercommunication for the different floor levels, is natural ; for though, considered singly, there may be easier or more economical media, yet this feature combines these two advantages.

In Assyrian and other dwellings of remote antiquity, inclined planes were not unfrequently used, very much in the manner employed for modern storeyed-stables. There are points favourable (and otherwise) to inclined planes for domestic use. To dispose first of the advantages :—Slopes of easy gradient are preferable to stairs in buildings devoted to blind people ; and similarly in places where invalids in wheeled chairs desire to pass from one level to another. The blind develop a marvellous faculty for self-help and self-guidance in moving from post to post, and from level to level ; but the shock that ensues from the unexpected encounter against a possible obstacle, left on a flight of stairs by a heedless domestic, might cause an unpleasant spill, and this would be obviated by the use of an inclined plane.

It would be advantageous also in school premises, almshouses, infirmary pavilions, and similar buildings—advantageous at least from some standpoints, even if the disadvantages about to be considered should outweigh the advantages.

It may be noted here that in the most recent regulations issued by the London County Council respecting theatres and other places for public entertainment, a demand is made for the use of inclined planes where possible, in preference to steps in corridors, etc., with the caution that the gradient shall not exceed 1 in 10.* With respect to the practical disadvantages accruing from the use of inclined planes, the following arguments must be carefully noted:—

In using steps, a rise of—say 12 in. can be comfortably effected over a horizontal distance of 20 in., or even 18 in., equivalent to a rise of 1 in $1\frac{1}{2}$; this is beyond consideration for

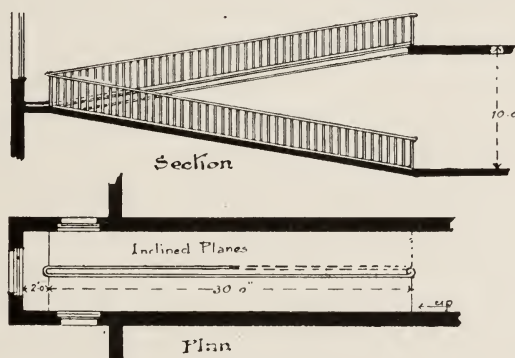


FIG. 31.

an inclined plane, though the author is acquainted with a subway gradient (in London) giving an incline of 1 in $2\frac{1}{2}$ with very trying results. A gradient more pronounced than 1 in 4 should not be regarded as practicable in such cases; indeed, even that gradient is only to be taken as the limit, for its use would soon prove impracticable for a prolonged rise, such as is required between two floors; and in such a case, 1 in 6 should be the steepest gradient employed. Reduced, therefore, to practice, this implies that, treating an inclined plane on the dog-legged (or the return) plan, a horizontal distance of at least 32 ft. would be necessary in order to effect a rise of 10 ft. from floor to floor; that is, a slope 30 ft. in horizontal length would rise 5 ft., a

* See Appendix B (Rule No. 11).

half-space landing at the half-way level should not be less than 2 ft. in width, and the *return slope* of 30 ft. horizontal length would span the remaining 5 ft. of height (see Fig. 31). The quantity of space occupied by this method could only be justified in a fair-sized building ; and it must also be noted, that a height of 10 ft. as instanced, provides only for clearing rooms 9 ft. 6 in. high or less, an inadequate height in buildings of any importance or size ; and furthermore, every 6 in. additional of height requires a horizontal distance of 3 ft. at a gradient of 1 in 6, or (on the dog-legged setting out) the horizontal distance would be 1 ft. 6 in. additional for each 6 in. of rise.

It is a further disadvantage that even a gentle gradient is less restful than stairs, the foothold on the latter being always horizontal ; and it is of course also disadvantageous to take so much longer time in getting from floor to floor by means of an inclined plane, as compared with stairs.

It will thus be seen that the balance of advantage is against the general use of inclined planes.

Primarily, a staircase should be adequately lighted, and this is better accomplished by providing a window in preference to a roof light, and the former method has the concurrent advantage of giving more efficient ventilation. If solely depended upon, a top-light is apt to produce an appearance of sombreness ; in these isles, accustomed as their inhabitants are to frequent and ever more frequent rain, the weather should be borne in mind ; for of all dreary sounds, the pattering of rain-drops upon glass is the most dreary ; and this, in conjunction with the gloomy light that would peer through the panes, necessitates alleviation by the use of side-lighting.

But a top-light may be beneficially used as an auxiliary, and may prove very effective if coloured glass be employed.

The mistake should be avoided of unduly cramping the width of any flight of stairs : two people should be able to stand abreast comfortably on any ordinary staircase ; but this precept is more honoured in the breach than in the observance.

In certain cases, such as for turret or similar stairs, com-

municating with a library gallery, or for the use of bell-ringers, etc., the width need not exceed what is necessary for the passage of one person. On the other hand, staircases for important receptions or ceremonies should be of a minimum width to allow of the unrestricted passage of four people abreast, so that a lady escorted by a gentleman can pass in comfort a similar couple.

For ordinary stairs, a width of 3 ft. to 3 ft. 3 in. should be the minimum, and for State stairs, the minimum width would be 7 ft.

Stairs also should not start flush with, or too near to a salient angle or to a door, as this promotes unpleasant collisions ; should a flight, however, be unavoidably near such an angle, the latter should be well rounded off.

It may easily arise, through want of due consideration, that an apparently satisfactory plan may prove faulty, when the sections are drawn, with respect to "headway," and this trouble may be avoided by the concurrent working of plan and section, thus saving many an error that may otherwise await correction by some makeshift expedient.

The thought that has been expended on establishing the correct ratios of tread and riser, and that has been bequeathed to the profession, should be welcomed by the legacy-holders, and freely used. There is not any advantage to be gained by needlessly trying experiments. In a house in the country, where the writer had to schedule and superintend repairs, a flight of stairs to the attic was constructed most absurdly with $10\frac{1}{2}$ in. risers, 7 in. or 8 in. treads, and a width of staircase of not more than 18 in. (memory suggests that this was 14 in., but it may be left an open question). The client—a lady—was present at the time the survey was made, and in commencing the ascent of these stairs, which consisted largely of winding steps, there seemed to be reason to fear that they would be permanently blocked by her ; but just at the moment when it was expected that a hatchet would have to be requisitioned for her excision, a quieter exit was effected. Risers 8 in. deep

are not as uncommon as they should be. The customary dimensions are 11 in. treads and 6 in. risers, and this gives a satisfactory result. The Queen's staircase at Kensington Palace has 14 in. treads and $4\frac{1}{2}$ in. risers, and though this is according to rule, it must be admitted that the effect when ascending is not very pleasing. A markedly unequal proportion of tread and riser provides a better step ordinarily both in appearance and for comfort; a rough guide for proportioning gives a product of 66 in. as the result of multiplying tread and riser; tabulated, the nearest practical approximations to this product give—

Width of Tread, in inches	8	9	10	11	12	13	14	15
Height between Treads, in inches - - -	$8\frac{1}{4}$	$7\frac{1}{4}$	$6\frac{1}{2}$	6	$5\frac{1}{2}$	5	$4\frac{3}{4}$	$4\frac{1}{2}$

The moral of this table is, *never* to use 8 in. treads, and to avoid as far as possible even 9 in. A width of 10 in. is the minimum for planting comfortably on the stairs the foot of the average adult.

Plan and artistic design being intimately associated in the treatment of staircases, it is inadvisable to attempt to effect a divorcement. There are various forms of "case" or enclosure from which to make selection, such as oblong, square, polygonal, circular, oval, or a combination of these. A point for decision will be as to the provision (or otherwise) of a "well," *i.e.*, a central opening. Where rigid economy of space is not necessary, the use of a "geometrical" staircase (as one with a "well" is designated) is, in general, favoured by architects, by reason of its infinite possibilities in the way of design. In Fig. 32, a few methods of disposition are shown, but the possible variants on these and other methods militate against monotony.

Three important points to be borne in mind in regard to these stairs are (1) the hygienic value of the well from the standpoint of increased ventilation, (2) the greater difficulty

created for efficiently and economically heating the staircase, and (3) the extra danger involved by providing an air-chamber, that, in case of an outbreak of fire, would seriously enhance the risks of spreading what might otherwise be but a slight conflagration. In a private house, of course, the perilous results to be feared are less than they would be in a densely-populated building.

The utility, as distinguished from the æsthetic possibilities of the geometrical staircase, is most apparent in the increase of lighting facilities afforded. The "well" also forms a good position for a lift; but bearing in mind the disadvantages above enumerated, its employment shows but doubtful wisdom.

This being so, it is well to turn to other dispositions, such as the *dog-legged*, the *straight*, and the *newel* stairs. The first of these has the contiguous flights returning on their direct line of plane, as in Fig. 33;

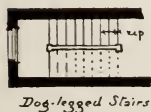


FIG. 33.

and the flights follow but one right line of plane throughout. The newel-stair may be of the circular or the rectangular varieties, and the newels themselves may be either hollow or solid, or open in disposition; by the open-newel staircase is to be understood one composed of hanging steps let into newel-posts along the line of "well" at intervals.

In metropolitan theatres there is, perforce of the London County Council, a preponderating use of the rectangular hollow-newel stairs (see Fig. 34). It cannot be denied that the provision is a wise one, but it undoubtedly militates

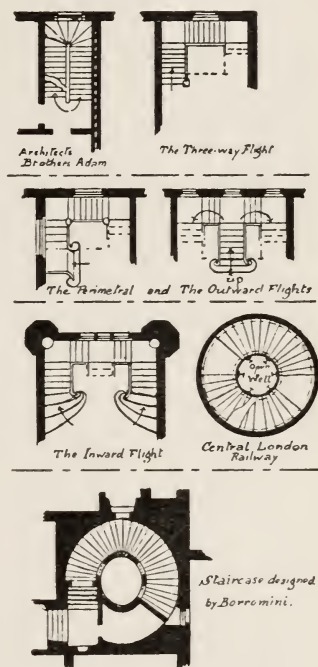


FIG. 32.

against the production of a pleasing staircase. Extra-metropolitan bye-laws not infrequently provide for similar treatment.

It has been noted earlier that the minimum "going" (*i.e.*, the *width* of tread) should be 10 in. for comfort; when, however, dealing with winding steps, or "winders" as they are habitually called, the width of 10 in. will be the *average* width of the step. At the narrowest point the width should not be less than 4 in., and when this happens to be the handrail end (as in the case of geometrical stairs), 6 in. should be the minimum. The customary method is to set out the width of

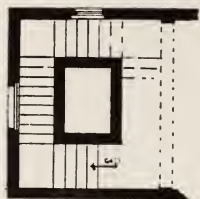


FIG. 34.

winding steps along their forward axial line. "Dancing steps" are merely improved winders, being set out each independently of the others, instead of radiating from one centre, as in the case of the ordinary winders. But all these steps should be relegated to occasions when they cannot be avoided.

It is desirable that the staircase should not face the entrance-door when it can be otherwise arranged—desirable merely from an æsthetic point of view in many cases; but in a house where there is only a single staircase, the desirability has an increased value, on the score of privacy.

It is necessary to avoid falling into the error of thinking that a prettily-*planned* stairway has any æsthetic value; it has not any at all, perspective effects being the great consideration, and elevational effects admitting of some claim; but some remarks occurring later as to beauty of plan, the matter need not be pursued here.

Though it is not the author's object in this book to enter much into detail, yet it may be advisable to make a few remarks in regard to *ingle-nooks*, a feature greatly in favour at the present day. Undoubtedly it has a pleasing appearance, but it has also its limitations; for example, it is an error of judgment to confine the *main* window-lights or the fireplace within the bounds of an ingle-nook; but for subsidiary lights, the treatment is quite permissible. The desirability of the unhampered

movement of adequate light and heat in any apartment should not need insistence, but still it is too frequently the case, that matters mundane are arranged as they should not be, hence the necessity of these remarks. If the fireplace is set within an ingle-nook, it is less likely that the heat will fulfil its primary object—that is, to warm the whole room; and if such a nook has casements or sliding sashes, it is likely to prove draughty. Should a fireplace-nook be insisted upon, let the window lights be fixed; it does not answer well that there should not be any special light at all, as this would render the fireside all but useless for reading purposes, except at the expense of affecting the eyesight. However, it is better to overcome any lurking desire to introduce such an ingle-nook; let it be relegated to the limbo of the portfolio of faulty features. And similarly with respect to *main* window-lights. For the purposes of a cosy corner, however, an ingle-nook has every recommendation, but in order to justify its character, it should be decidedly cosy; if situated S.E. to N.W. as in Fig. 35 (a), the windows should be as there shown, thus introducing the S.E. sun and giving

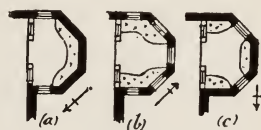


FIG. 35.

also a N.W. window; by this means, the sun is debarred entrance during its most trying heat, and the window seats being fitted as shown, sufficiently indicate the architect's recognition of the objection to sitting directly facing the window. If the position of the ingle-nook were as at (b), then windows could, as regards sunlight, be introduced on all sides, if desired, but it would be preferable to have the canted sides, A and B, as solid walling, an excess of light interfering with the character of cosiness.

To fenestrate an ingle-nook with the compass-points as shown at (c), the two canted sides alone should have windows and the seating might be as shown; a direct west window in such a nook is inadmissible in the principal position, and though S.W. is not desirable, it is yet preferable to direct south, either in summer or winter.

The three examples given will suffice here in regard to

detailed explanation, but below in Fig. 36 are shown the fenestration and seating for a similar ingle-nook with the compass in the remaining cardinal positions ; a five-sided nook has been



FIG. 36.

used for illustration, as being typically diagrammatic. The window-seating is not a fixed quantity, the main point to remember having been stated above.

Lockers are a too frequent provision in connection with fixed seats ; for, if utilised, it may well happen that people using the seats will be disturbed for the purpose of a visit being made to the locker. If, however, they are provided, they should have sliding doors in preference to top flaps, so as to minimise disturbance.

If seats are provided in wide window-bays, and columns are required in the opening to aid in carrying the bressummer or



FIG. 37.

girder over, these columns should preferably be arranged as in Fig. 37 at (a) and not as at (b), and a slight balustrade could, if desired, be provided to fill up the narrower intervals. The latter disposition of columns would be clumsy, interfering with a comfortable view of the apartment, with easy locomotion and with æsthetic effect.

In connection with window-seats, it may be noted that it is well to avoid carrying them the whole length, more particularly where the recess is shallow, as space for an "occasional table" or possibly for a fixed or flap-shelf should be provided ; all such trifling aids for comfortable enjoyment are very desirable provisions (see Fig. 38).

A few notes on lifts will be in place here, but the treatment will not be, by any means, exhaustive.

The advantages accruing to the occupiers of a dwelling-house from the possession of a service-lift cannot be overrated. The saving in labour for purposes of conveying fuel, whether for external or internal consumption, when the domestic offices are on a different floor to the living-rooms, renders the attendant initial expense a justifiable one, even if there be not any actual recoupment in money.



FIG. 38.

The average space, too, required for a coal-lift or a dinner-lift is not such as to render it a matter of difficulty to find the necessary room; for all ordinary purposes, a cage not exceeding 2 ft. by 2 ft. suffices, the well-hole (as it is called) giving an average allowance of some 3 in. to 6 in. working space around the cage. Some stock sizes may be useful.

Cage.	Width	-	-	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.
				1	3	1	6	1	9	2	0	2	0	2	3
	Depth	-	-	1	0	1	3	1	6	1	6	1	9	1	9
Well-hole.	Width	-	-	1	10	2	1	2	0	2	7	2	3	2	10
				1	5	1	8	1	7	1	11	1	10	2	2
	Depth	-	-	1	5	1	8	1	7	1	11	1	10	2	2

These are sizes of "single-cage" lifts, "double-cage" requiring rather more than double the width. At the back of the lift, as a rule, less space is required than at the sides, where the gearing, etc., is customarily arranged. But details of that nature do not greatly concern the architect.

Service-lifts of this nature not requiring skilled attention, it is a matter of wonder that their use is not more general. It is different with passenger-lifts, but these are not customarily introduced into private dwelling-houses, nor does there seem any reason why they should be, except where there are several storeys in the dwelling. But a luggage-lift in a private house

is very desirable, 4 ft. by 3 ft. being a good average size for the cage.

For blocks of office-buildings, warehouses, and indeed for business premises generally, passenger and goods lifts are in great demand, the "well" of the staircase in a large number of instances being utilised for the passenger-lift. This has its advantages and disadvantages. If there should be delay in the appearance of the cage, time is then saved by the immediate use of the stairs, and this is an important matter during business hours. But a disadvantage of some import is the draught-shaft

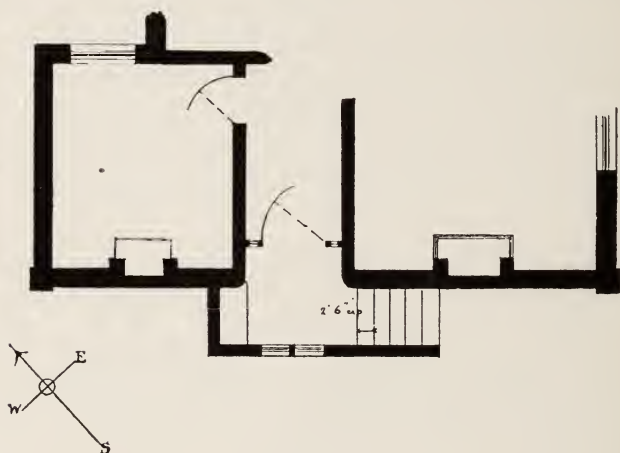


FIG. 39.—THE USE OF A PORCH AS A WEATHER-SCREEN.

provided by the open well-hole, which in a case of fire has often led to disastrous consequences.

In hospitals, specially large lifts are often provided for the transference of bed-ridden invalids from floor to floor, on occasions when an operation may have been necessary.

In carriage and piano factories and depôts, large and specially strong lifts are necessary. Many other instances might be noted, but the special requirements must be considered in each case. The arrangement and disposition of passenger-lifts in the Imperial Institute, London, is particularly neat; Mr T. E. Collcutt is the architect.

With regard to an *Entrance-porch*, it may be urged in its favour that it provides a temporary shelter to those awaiting entry into the house ; this is appreciated, whatever the season of the year. An additional advantage exists by reason of its serving to break up the elevation, and thus add to the effect legitimately obtainable.

Porches have a further advantage, and one not to be despised, for they can correct the Aspect most effectually, as well as help to screen the entrance-hall from inclement conditions of the weather.

In the sketch shown in Fig. 39 it will be evident that the hall is screened from the blustery south-west gales by the introduction of the porch shown.

The *Entrance* is frequently disposed on a different side of the house from that utilised for the principal rooms, in order the more effectively to secure the privacy of the latter ; there is something to be said in favour of this planning, both on the score of æsthetic and practical grounds.

It is well, where it can be afforded, to provide a *Conservatory* attached to the Drawing-room. Even if it be only a small one, it forms an interesting feature, a pleasant exit to the garden, and will act as a natural means of ventilation to the drawing-room. The floor should be kept about 2 in. at least lower in level, the gangways should be about 2 ft. 6 in. in width, and the longitudinal axis by preference should be north and south.

FITTINGS.

The few remarks to be made under this head may include references to items usually known as fixtures ; but as there is not any legal question involved, the latter term may be disregarded for the purpose.

It is well to avoid the vasty and nasty wooden enclosures to fittings which were so common a feature for the greater portion of the nineteenth century. The growing belief in their

insanitary qualities is to be commended, and fortunately it is becoming a matter of course that they should be omitted.

Baths, lavatory suites, W.C. apparatus, and sinks of all kinds should all be left unenclosed; and there are such large capabilities of selection from those put on the market, that every taste and requirement should be enabled to find satisfaction.

The floors of rooms should be unencumbered by heavy furniture, which cannot be moved without difficulty; or if such articles are favoured, they should stand on legs at least 9 in. high. If this point is attended to, there will not necessarily be any accumulations of dust and flue, which are not only objectionable but also insanitary.

The desirability of utilising the angles of rooms has been recognised to a slight extent, and will bear further recognition. Angle sinks and lavatory basins (more especially the latter) might be advantageously adopted to a much greater extent than at present. At times, also, angle W.C. fittings may be used, though usually there is little to be gained by it; there is not any reason to be urged against the adoption of bracket W.C. apparatus generally. At present, its use seems to be confined to a few hospitals; where the valve system is desired, such fittings are at present impossible, as they do not exist in this form, and until recently the employment of this system involved the use of a wooden enclosure; but a "pedestal-valve" apparatus is now on the market which is a great improvement, and obviates the use of the objectionable feature.

In planning houses, the provision of cupboards is too often neglected. For a considerable period these useful adjuncts went out of fashion apparently, but there are healthy signs of their readmittance to favour; and when it is remembered that their provision can be ensured without entailing any considerable loss of space or expenditure of money, the wonder is that so many houses have been left unprovided in this respect. The narrowest space need scarcely be despised for the purpose; underneath flights of stairs and in recesses formed by chimney-breasts, etc., cupboards work in admirably. Blocks of offices also benefit by

the provision of cupboards, which (perhaps somewhat paradoxically) seem to give room, instead of occupying it. Corner cupboards, it may be noted, form a pleasing feature, giving the desired accommodation in a living room, and at the same time taking off the crude effect of the angles.

CHAPTER IX.

ECONOMY.

UNDER this heading it is intended to dwell on the increased difficulties that an Architect experiences when freedom of scheming is curtailed for the sake of lessening expenditure.

The exercise of Economy leads to many makeshifts—some unavoidable, it is true ; but in many cases the employment of some ingenuity will overcome apparent obstacles.

The majority of the plans shown in this book have been freed purposely from the fetters forged by narrow purse-strings, as the object has been to exemplify the more vital principles that should influence building schemes. Broadly considered it should not affect the application of these principles even if £500 be the substituted expenditure for £5,000 ; it may result in decreased accommodation and cheaper materials, in less luxurious decorations internally and less ornate elevations externally, but it should not affect, except to a minor extent, the satisfactory consideration of the broad principles of planning. The object, therefore, is to discover the limits of permissible alterations on the score of economy.

As regards furniture requirements, the irreducibly correct minimum *size* of any piece should not be lessened, even from the standpoint of economy ; but it is frequently possible and permissible to plan a room or an office for a diminished *number* of articles. A Dining-room may provide for fewer diners ; a Drawing-room may be relieved of the odds and ends of cabinets, tables and chairs, that take up so much space and that may well be dispensed with under the circumstances.

Bay-windows may be omitted except where their provision is for correction of Aspect, and similarly with porches, lobbies,

and vestibules; *i.e.*, "features" (as such) may be omitted where Economy is a necessary consideration.

In the Kitchen, the size of the dresser may be reduced; the larder may be made smaller than absolute convenience would dictate, as also the scullery.

Stairs may be diminished in width and have steeper risers and also "winder" steps, so as to take up less space, and the size of passages and halls may be reduced. Cupboards also may be omitted.

The word "may" is used advisedly, as in many cases *all* these drastic measures for economy would not be necessary, and the architect could make his own selection; and it must be remembered that the subject is being dealt with here only as respects the possible effects on planning.

Economy should not have an evil effect on the grouping or Aspect. Indeed it may frequently result in a compact plan being produced, where otherwise a straggling, badly-knit scheme would have seen the light.

It was but recently that the plan of a large private house was noted, where it seemed a day's journey from Kitchen to Dining-room, without any intermediate servery being shown and the food as a result could not but cool in transit. A more compact plan could have obviated this. "Prospect" must be regarded as a possible sacrifice under circumstances such as are now being considered.

One mode of treatment where plans powerfully affect this subject is the introduction or avoidance of irregular angles. For example, where economy has to be given heed to in a house, an octagonal or hexagonal hall would not be used, nor would angle fireplaces. By this means a fruitful source of increased expenditure is avoided.

Another point to bear in mind is that, in like circumstances, if dealing with a site that has a rapid slope, the plans would be accommodated to the latter, where in other cases the ground might be brought to a level to suit the plans. The latter arrangement entirely obviates the exercise of any ingenuity,

so that although from an artistic standpoint it may be desirable, it diminishes the professional value of the building.

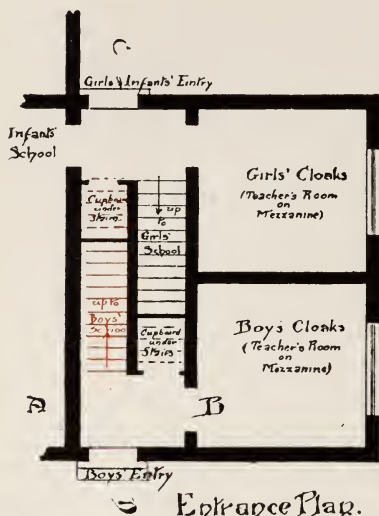


FIG. 40.—COMBINED GIRLS' AND BOYS' STAIRCASE FOR BOARD SCHOOL.

As regard Board Schools, for example, such a case occurred a short time since with a country site, where the tremendous slope was proposed to be utilised in the provision of boys' covered play-ground, and in addition for giving entry to boys' staircase, by which means an ingenious arrangement of getting the girls' and boys' staircases in the same compass of walls was obtained. The sketches in Figs. 40 and 41 show an arrangement of staircase on the above lines, originated by a former architect to

the London School Board many years since.

It may be thought that too much is written in this book on

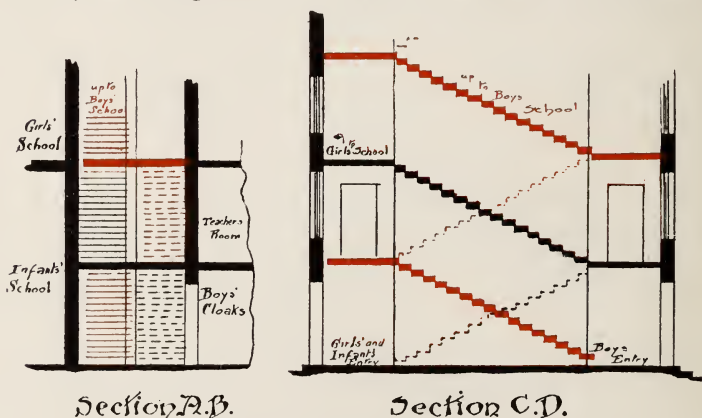


FIG. 41.—SECTIONS OF STAIRCASE SHOWN ON FIG. 40.

the subject of symmetry, so at this point it will be briefly noted that such treatment is difficult to *ensure* in private buildings

when economy is a consideration, and similarly with what may well be termed "sham planning" of all kinds. This, though, would not be the case with such buildings as artisans' dwellings, Board Schools, workhouses, etc., where at least a quasi-symmetrical exterior would be likely to produce the most economical result.

CHAPTER X.

DESIGN IN RELATION TO PLAN.

THE word "design" is used in the limited significance of the "art" qualities displayed in the elevations. It has been elsewhere remarked that planning and design should be considered concurrently, as a better result is likely to accrue by this means. A plan may be correct in every particular and yet produce a most uninteresting elevation.

Were there only two alternative selections, viz., a good plan and inartistic design, or a pretty house with a poor plan, there should not be any hesitation in making choice. However, plan and design can, with a little trouble and permissible compromise, usually be more or less effectively combined; and if, for simplification, the item of expense be disregarded here, there are boundless possibilities in the way of obtaining a good appearance externally for a well-devised plan. And remarks that apply forcibly to external design are also applicable, in a lesser degree, to internal decorative treatment.

It must not be regarded as a question merely of symmetry or ametry. The former is not indispensable, though often desirable; and to court shams and inconvenience, as is so frequently done, in order to obtain a symmetrical building, is a grievous fault. Some disputants urge in this connection the *argumentum ad personam*, remarking that human beings (and indeed most animal objects) show a symmetrical front; but in that very argument lies their defeat, as it is patent that a vertical central line being taken, the functions of the members are for the most part similar right and left of this central line, whereas in most buildings the case is reversed.

In museums and similar buildings, symmetry can be intro-

duced most effectively and righteously; and a large portion of the delight with which most people view the Natural History Museum Buildings at South Kensington* is traceable to the fact that the exterior design emphasises the plan. Balance is a quality that must always be present, nor will grace of detail condone its absence.

A simple illustration drawn from nature will give point to this contention. If the giraffe and gazelle be contrasted, it may be noted that neither beauty nor refinement are lacking in either, yet the result in the one case is unpleasing, indicating a distinct want of balance of parts in the giraffe, whilst the gazelle is a perfect and harmonious object of nature.

It is indeed only by means of the architect's earnest attention to all matters big and little, artistic and technical, that a thoroughly satisfactory result can be attained.

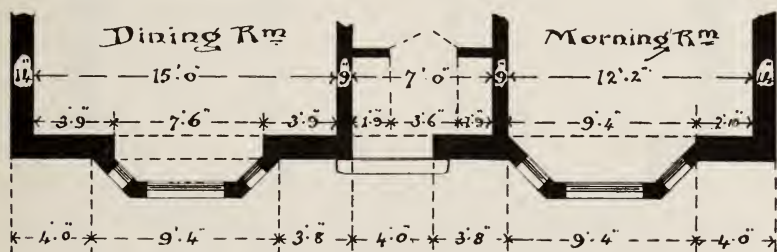


FIG. 42.—SETTING OUT A SYMMETRICAL FAÇADE.

After airing principles in the manner just set forth, it will be well to give more specific directions of the way to act in practice; and primarily it must be remembered that even as it is an error to sacrifice unduly to the idol called symmetry, so also is it wrong to despise it wilfully. In dealing with a plan and façade as indicated on the sketch shown in Fig. 42 (and this type is of common occurrence), the bay-windows may advantageously be dealt with more or less symmetrically. Thus the first consideration would be the Dining-room. It would be natural, after deciding on the width of window space,

* For plan of Natural History Museum see Plate XLII.

to place it centrally along the wall; this would be the keynote to which all the rest would be tuned. It will be noted that the final effect of symmetry is external, and this is as it should be, as the whole façade can be focussed in one view, whereas the interior cannot be taken in visually from one standpoint. Again, the symmetry externally is set out, in this case, from the angles of the façade, for with the given dimensions and the given treatment of Dining-room as the basis, the planning, if set out from the centre line, would make the Morning-room angle weak—at least, that would be the effect. Otherwise it is better to work as much as possible from central lines. The Morning-room can dispense with symmetry, and indeed is the better for its absence, gaining thereby in increased freedom from stiffness.

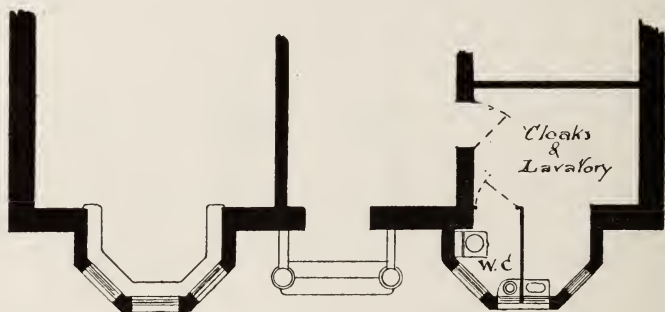


FIG. 43.—AN EXAMPLE OF CULPABLE SYMMETRY IN A FAÇADE.

Another example may be taken, which will be adequately illustrated by the sketch shown in Fig. 43. There are some who would not hesitate to instal a bay-window in the cloak-room, similar to that in the Drawing-room, nor would they feel any qualms of conscience. The correct mode is to recognise frankly the propriety of treating each room as a separate entity; it is an excess of pseudo-sentiment to consider it necessary to mask these offices. However, to meet the views of those who yearn for a symmetrical elevation, it might be possible to shift the position of cloak-room and its adjuncts altogether, and to substitute a reception-room.

It will not be amiss to mention here a mechanical aid to

planning, brought to the writer's notice many years ago, and to be found dealt with by Professor Kerr in one of his books. It has distinct merits of its own that should recommend it favourably.

Having settled on the approximate superficial dimensions of the various rooms, separate pieces of cardboard are cut to a uniform scale and representing the different apartments; there are also pieces to represent staircases, passages, etc. The architect is thus enabled to twist and turn the whole of the pieces about, and get a quicker grasp of possibilities and a better notion of the desirable treatment of the scheme, than by indefinite plottings on paper, where indiarubber is not unlikely to play a prominent rôle. The present writer has frequently used this system in the earlier stages, and has found it advantageous.

Intimate as should be the relation between plan and elevation, it will be found that the best design in a majority of cases results from giving full effect to the true lines of the plan, if the latter is well considered. Look after the plans, in short, and with comparative facility the main lines of the design will look after themselves. The ancients produced buildings that are admired to-day, the feeling doubtless being largely due to the sincerity, the frankness exhibited and emphasised; this may be unconsciously the source of our delight, but so intimately do truth and beauty act and react on each other, that it may well be difficult to ascribe feelings to their rightful source. When, however, a thoroughly satisfactory building is noted, the most should be made of it, as by studying it the chances of evolving further equally notable buildings are largely increased.

Before bringing this treatise to a conclusion, it may be well to deal briefly with sundry points to which but slight attention has hitherto been devoted. It has been urged by some critics (whose interest in the subject matter of this work is as keen as the author's) that amongst the principles should be included the following:—Axiality, mass, proportion, focus, and the beauty of line in plan—in one word, Planæsthesia.

That these points were but slightly dealt with in the former

edition was not the result of oversight, but of measured consideration, and the author regards it as a testimony to the value of his reasoning that the combined criticism should refer in the main to such points as rank in one category.

Those people, whose views are voiced by the critics mentioned above, should remember that the lines of the plan are merely means to an end. Beauty of plan exists merely on paper, so far as buildings are concerned, and in the process of transference from the draught to the embodiment, the *lines* of the plan lose their significance as elements of beauty as they become merged in the lines of the elevations ; it is in the latter that beauty, as a factor of design, plays a part, and one, it must be remembered, of great import.

The pleasure afforded by an "æsthetic plan" begins and ends with its appearance on paper. To perpetuate it, it would be necessary to invoke the services of a Santos-Dumont, whose airship would require to be poised directly over the building to be viewed, and at a sufficient height to focus the whole and to obtain the effect of mass as opposed to detail. Indeed, to carry the argument to its logical conclusion, in order to obtain an effect similar to that afforded by the draughtsman's typical plan, it would be necessary to slice away the roofing, to blacken all sectional walling, and limewhite all floors and finished surfaces.

It is a matter of wonder to the author that this want of value of planæsthesia, in regard to buildings, is ever questioned. When, however, landscape gardening or pavement decoration is under consideration, then planning is, to a great extent, both means and end ; and, as a result, the æsthetics of line and form require every attention.

On the same plane of argument lies the consideration of axiality, proportion, focus, etc., in relation to plan. So far as any æsthetic value is attachable to one or more of these points, they are merely principles of design in relation to elevation. Respecting axiality, however, to the extent that its value can be demonstrated as providing in any particular case the easiest,

most practical communication between different rooms or between different blocks of building, does it possess a value in planning; but it cannot rightly be included as a principle.

This leads to the consideration of symmetry in plan. The author has been placed in the unfortunate position (doubtless through want of perspicuity on his own part) of appearing to despise symmetry. This is far from being the fact; but it is quite true that his enthusiasm in this respect is restricted to the lines of elevational design, except in those cases where the required accommodation lends itself naturally to a symmetrical disposition.

On this point also there is a great deal of misapprehension. The so-called "Gothic" type of plan (see Fig. 44) is frequently unfavourably contrasted with the demure lines of the Classic type. But in the case of a dwelling-house, at any rate, the chances are all in favour of a more suitably-disposed building in detail being provided by the former,

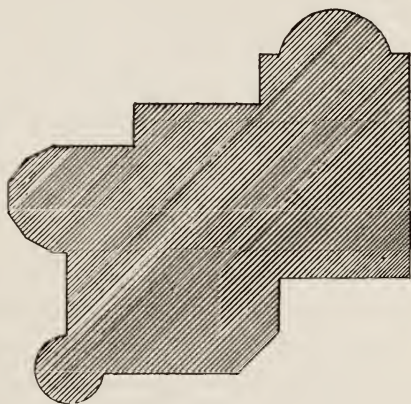


FIG. 44.

as contrasted with the latter type. When architects bear in mind the very different requirements in accommodation, in aspect, in relative position, in seclusion, or in privacy, demanded by the various rooms that unite to form a dwelling-house, can it be seriously doubted that license and not restraint of plan is the desideratum?

The nineteenth century of the Christian era, recently expired, was not entirely devoid of buildings worthy to rank with the *chefs d'œuvres* of the ancients; and were it possible to pierce the mists of futurity, glimpses would be obtainable of pilgrimages to these latter-day shrines similar to those now in vogue with regard to our ancient buildings. In order, however, to form one of that

small company of architects whose life, works, and influence will form part of the curriculum of future students, it will be necessary to give substantial heed to the signal merits of truthful design. Nor does this interfere with the use of adornments of all kinds, but necessitates their appropriation and selection on well-defined lines; they are not well adapted for cloaking errors, but have a distinct value for emphasising details and outlines. What more natural, if the form of roofing justifies it, than to deck it with a more or less ornate gable, thus aptly emphasising the construction; what more despicable than to insert for external effect, a window of respectable dimensions in a wall, this window being, however, partially built against solid walling. Fitzroy Square and other eighteenth-century buildings supply instances of this defect, and indeed some nineteenth-century buildings followed suit.

A writer but seldom read nowadays has well advised architects to be what they would seem, instead of seeking to seem what they would be.

In conclusion, it is sufficient to express a hope that the foregoing pages will bear a not unwelcome message to the patient reader, and will lead such to apply the principles underlying all true design to all work entrusted by the client for solution. Theoretically it is of equal importance to scheme an artisan's dwelling as carefully as a palace; but practically it is of greater importance, for the difficulties of satisfying hygienic requirements are in inverse ratio to the space at disposal.

The artist, it is said, can picture to himself the Venus in the rough block of marble; and similarly in the client's list of requirements should an architect be able to foreshadow the gradual and successful evolution of the desired building; and he will be in a better position to do this by possessing a thorough knowledge of the principles that form the foundation-stone of the art of architecture.

TABLE OF USEFUL MEMORANDA AFFECTING THE PLANNING OF BUILDINGS.

*N.B.—An * shows an extract from Hurst's "Handbook."*

		ACCOMMODATION.	DIMENSIONS.
Altar (Altar, Communion or Holy, Table)	-	-	6' 0" to 9' 0" long x 1' 6" to 2' 6" wide.
Art scholar (in Drawing-class Room)	-	30' 0" super.	
Assembly Hall (Secondary school)—			
Per scholar up to 500	-	8' 0" super.	
" above 500	-	6' 0" super.	
Avenues, Cart, in Market-house	-	-	20' 0" to 30' 0" wide.
*Ball-room, per guest	-	16' 0" super. (min.).	
Bath, Plunge (Unenclosed)	-	(maximum) 6' 3" x 2' 8" over all.	
* " " Water supply	-	40 to 50 gallons.	
* " " Shower,	-	3 to 6 gallons.	
Baths in Boarding schools, per scholar	-	8 per cent.	
" Douche, each	-	-	3' 6" x 3' 6".
" Slipper, each compartment	-	-	6' 0" x 6' 0".
Bed in Hospital Ward	-	-	6' 3" x 3' 4".
" " " Space along wall between beds	-	-	8' 8".
" " " Space across centre gangway between beds	-	-	10' 6" minimum.
" in House, Double bed	-	-	6' 6" x 4' 6" minimum.

Boiler, Saddle	-	-	-	-	-	-	1' 6" x 11" x 10" high to 6' 0" x 2' 6" x 2' 6" high.
Butcher's Refrigerating Chamber	-	-	-	-	-	-	4' 6" x 3' 6" to 7' 0" x 6' 0".
Cabinetmaker. See "Bench."							
Calf (in Abattoir)	-	-	-	-	-	-	8' 0" super.
Carpenter. See "Bench."							
Cashier's Box	-	-	-	-	-	-	3' 0" x 2' 6" minimum.
Casual Ward. See "Workhouse."							(say) 14' 0" x 14' 0".
Cell, Prison, Association	-	-	-	-	-	-	13' 0" x 7' 0" super. and 600' 0" to 800' 0" cube.
" " Solitary	-	-	-	-	-	-	
" See also "Workhouse."							
Central Hall, Elementary School, per scholar	-	-	-	-	-	-	3' 6" to 4' 0" super.
Chair Space in Theatres, &c. See "Seating."							
Champagne Bins. See "Wine Bins."							
Chapel. See "Seating" and "Stairs."							
Children, Elementary School, Class-room, per boy or girl	-	-	-	-	-	-	10' 0" super.
" " " " " infant	-	-	-	-	-	-	9' 0" super.
" " " " Desk (Boys or Girls), Dual	-	-	-	-	-	-	3' 4" x 2' 0".
" " " " " Long	-	-	-	-	-	-	12' 0" maximum length.
" " " " " (Infant), Dual	-	-	-	-	-	-	3' 0" x 2' 0".
" " " " " Long	-	-	-	-	-	-	1' 4" per child.
" " " " " Higher Elementary School, Class-room, Dual Desk	-	-	-	-	-	-	13' 0" super. per scholar.
" " " " " Single	-	-	-	-	-	-	2' 0" x 2' 0" arranged in pairs with 2" intervals and 2' 0" gangways.
" " " " " Secondary School, per scholar	-	-	-	-	-	-	16' 0" super. per scholar.
" " " " " See also references under "School."	-	-	-	-	-	-	18' 0" super.
*Church, per congregate (including Holy Table, Gangways, &c.)	-	-	-	-	-	-	5' 0" to 7' 0" super.
" See also "Seating."							
Cistern. See "Tank."							

	ACCOMMODATION.	DIMENSIONS.
Class-room. See "Art scholar," "Children," "Cookery," "Gangway."		
Cloak-pegs (Schools)	1' 0".	
" as fixed in two heights chequerwise, gives for each foot run	2 pegs.	8' 0" wide.
Coach-house doors	-	-
Coals. Allow per ton in cellar	-	(average) 45' 0" cube.
Communion Table. See "Altar."	-	-
Concert Hall. See "Seating," "Stairs."	-	-
Confectioner: Show-window	-	1' 6" to 2' 6" depth.
" See also "Oven."	-	-
Cookery Class (School), per scholar	40' 0" super.	-
" " Proportion of clear floor area, per scholar	20' 0" super.	-
" " Proportion of table, per scholar	2' 6" square.	-
Copper, Washing	Ranging from	1' 3" to 2' 6" diameter for pan.
Corridor (Elementary schools) for Boys or Girls	"	8' 0" to 12' 0" wide.
" " " Infants	"	16' 0" wide.
Cot. See "Bed."	-	-
Cottage Homes. See "Bedroom."	-	-
Cottage Range. See "Range."	-	-
Counter	-	2' 6" to 4' 0" wide.
Cow in Abattoir	-	-
* " (Water supply, per day)	24' 0" super.	-
Cow-house, Dunging Passage	8 gallons.	-
" " Feeding	-	4' 6" wide, including gutter.
" " Stall (double)	-	3' 6" wide.
" " " (single)	-	7' 0" x 7' 0".
*Cow-shed (Shelter only), per beast	-	4' 6" x 6' 0" to 7' 0".
Cubicle for Nurse	40' 0" to 60' 0" super.	-
" " School dormitories	-	13' 0" x 8' 6".
	-	8' 0" x 8' 0".

Desks. See "Children "	-	-	-	-	2' 6" to 3' 0" in depth.
" for Office clerks -	-	-	-	-	-
Dining Hall, per scholar	-	-	-	-	10' 0" super.
" table (ordinary), per guest	-	-	-	-	2' 0" width.
" (school), per scholar	-	-	-	-	1' 8".
" (social)	-	-	-	-	-
" Dog in Kennel -	-	-	-	-	2' 6" to 12' 0" super.
Draper's Show-window -	-	-	-	-	-
Drawing-room, per occupant (excluding general Furniture)	-	-	-	-	10' 0" super.
Dresser in Kitchen or Scullery (average)	-	-	-	-	-
Dressing-box, Swimming Baths (Men)	-	-	-	-	5' 6" x 1' 6".
" " " (Women)	-	-	-	-	3' 0" x 3' 0".
" " " Turkish Baths, "Apodyterium"	-	-	-	-	4' 6" x 4' 0".
" " " " "	-	-	-	-	6' 0" x 6' 0" (one person), 7' 0" x 6' 0" (two), 12' 0" x 12' 0" (four).
" " " " "	-	-	-	-	6' 0" x 2' 0".
Dressing-table, Area of top	-	-	-	-	2' 9" x 1' 6" to 4' 6" x 2' 0".
Drying Closet, Ordinary draw-out	-	-	-	-	1' 0" wide.
" Horse, Radial -	-	-	-	-	4' 6" to 7' 0" diameter.
Earth-closet apparatus -	-	-	-	-	1' 10" to 3' 0" wide by 2' 4" deep.
Engine, Electric Lighting (bed-plate size)	-	-	-	-	4' 0" x 1' 6" to 6' 8" x 2' 0".
" " " and Dynamo (combined)	-	-	-	-	5' 6" x 2' 3" to 25' 0" x 3' 3".
" Gas and Oil -	-	-	-	-	4' 6" x 2' 7" to 14' 3" x 13' 6".
Engine-house, Fire Brigade	-	-	-	-	40' 0" x 28' 3".
Fire. See "Engine-house."	-	-	-	-	-
Font -	-	-	-	-	1' 6" to 2' 6" diameter.
Forge -	-	-	-	-	2' 2" x 1' 10" to 2' 4" x 2' 0".
Fruiterer's Show-window	-	-	-	-	6' 0" to 8' 0" depth.
Gangway for Assistants behind Counter	-	-	-	-	2' 6" wide.
" in Class-room between Desks (Dual)	-	-	-	-	1' 4" "

	ACCOMMODATION.	DIMENSIONS.
Gangway in Class-room between Desks (Long)	-	1' 6" "
" Cloak-room (Schools)	-	4' 0" "
" Cow-house	-	3' 6" "
" Restaurant	-	3' 0" wide minimum.
" Stables	-	8' 0" to 10' 0" wide.
" Theatres alongside rows of seats	-	3' 6" wide.
" " in front of each seat	-	1' 0" "
Hat-pegs. See "Cloak-pegs."		
Hay, per truss of 56 lbs.	12' 0" cube.	
Hay rack, Angular	-	2' 6" to 3' 0" across top.
" Central	-	2' 4" x 1' 4".
Holy Table. See "Altar."		
Horse. See "Hay," "Manger," "Stables."		
Hospital Ward, per patient, with gangways	144' 0" to 156' 0" super., 1,800' 0" to 2,000' 0" cube.	
* " " " " Water supply	27 gallons per day.	3' 0" to 6' 0" long x 2' 0" wide.
Hot Closet	-	-
Hotel. See "Bedroom," "Range."	-	-
*House, Daily water supply, per inmate - Hydro-extractor. See "Laundry."	20 to 25 gallons.	-
*Ice (Storage-room, per cwt.)	6' 0" cube.	
Inclined Planes (maximum gradient)	1 in 6.	
Kennel, per each box and each yard	36' 0" super.	
Kitchen Range. See "Range."	-	
" table	-	4' 6" x 3' 0".

Laboratory, per scholar	-	-	30' 0" super.	-	1' 10" to 3' 6" diameter.
Laundry, Hydro-Extractor	-	-	-	-	6' 0" x 2' 8" to 8' 6" x 3' 3".
" Mangle ("Box" type)	-	-	-	-	-
" table, per scholar	-	-	3' 0" lineal.	-	-
Lavatory basins (Day schools), scholars to 100	-	-	10 per cent.	-	-
" " (Houses), circular	-	-	6 $\frac{2}{3}$ per cent.	-	10" to 1' 10" diameter.
" " " oval	-	-	-	-	1' 2" x 1' 0" to 2' 3" x 1' 9".
" " " " "	-	-	14' 0" super.	-	-
Lecture-room (Secondary schools), per scholar	-	-	2' 0" x 1' 3".	-	-
Library (per reader at table) Magazine-room	-	-	2' 6" x 1' 0".	-	-
" " " News-room	-	-	-	-	4' 0" x 10".
" Bookcase	-	-	-	-	4' 0" x 2' 4".
" " Plinth Portion for Folios	-	-	-	-	-
" Book-lift. See "Lift."	-	-	-	-	2' 0" wide.
" Counter in Lending Library	-	-	-	-	2' 0" wide minimum.
" table in Magazine-room	-	-	-	-	2' 6" " "
" " News-room	-	-	-	-	-
Lift: Cage for—	-	-	-	-	9" x 9" to 1' 0" x 1' 0".
Books	-	-	-	-	2' 6" x 2' 0" to 6' 0" x 4' 0".
Cellar	-	-	-	-	2' 0" x 2' 0".
Coal	-	-	-	-	1' 0" x 10" to 3' 0" x 2' 6".
Dinner, etc.	-	-	-	-	2' 6" x 2' 6" to 4' 0" x 3' 0".
Luggage	-	-	-	-	2' 6" x 3' 0" minimum.
Passenger	-	-	-	-	2' 0" x 1' 6" to 9' 0" x 5' 0".
Warehouse	-	-	-	-	-
Loose Box. See "Stables."	-	-	-	-	-
Manger, Angle, circular	-	-	-	-	1' 6" to 1' 8" across top.
" " square	-	-	-	-	3' 6" x 2' 4" to 3' 5" x 3' 5" with 1' 6" projection
" " " "	-	-	-	-	2' 1" x 11" to 3' 0" x 1' 4".
" Centre	-	-	-	-	4' 0" x 1' 6" to 6' 0" x 1' 6".
" sets	-	-	-	-	-

				ACCOMMODATION.	DIMENSIONS.
Mangle. See "Laundry."					
Market Avenue	-	-	-	-	20' 0" to 30' 0" wide.
" Shop	-	-	-	-	12' 0" x 8' 0".
" Stall	-	-	-	-	5' 0" x 5' 0" to 6' 0" x 6' 0".
Metal-workers. See "Bench."					
Milliner's Show-window	-	-	-	-	2' 6" wide (average).
Motor-carriage House	-	-	-	-	9' 0" to 10' 0" maximum width.
Music canterbury (Whatnot)	-	-	-	-	1' 6" x 1' 0" to 2' 0" x 1' 3".
" practice-room	-	-	-	-	8' 0" x 6' 0".
Nurse's cubicles. See "Cubicle."					
Oven, Baker's	-	-	-	-	6' 0" x 4' 0" to 11' 0" x 9' 0".
* " " for each bushel of bread	-	-	-	-	7' 0" super.
" Confectioner's	-	-	-	-	2' 8" to 3' 2" x 2' 0".
Ox in Abattoir	-	-	-	-	24' 0" super.
* " in Shed (Shelter only)	-	-	-	-	40' 0" to 60' 0" super.
* " (Water supply, per day)	-	-	-	-	8 gallons.
Passage to Theatre (External)	-	-	-	-	10' 0" wide.
" " (Internal)	-	-	-	-	3' 6" wide.
Pianoforte, Horizontal Grand	-	-	-	-	5' 6" x 4' 9" to 9' 0" x 5' 3".
Pig in Abattoir	-	-	-	-	6' 0" super.
* " in Shed (Shelter only)	-	-	-	-	10' 0" super.
" (Sow and Litter in "Box")	-	-	-	-	80' 0" super.
* " (Water supply, per day)	-	-	-	-	1 gallon.
Playground, per scholar, in Elementary Schools	-	-	-	-	30' 0" super.
Poultry House and Run (for 12 fowls)	-	-	-	-	4' 0" x 4' 0".
" " " (for 50 ")	-	-	-	-	8' 0" x 6' 0".
Prison. See "Cell."					
Pulpit	-	-	-	-	3' 6" minimum diameter.

Rack, Cow-house	-	-	-	-	6' 6" to 8' 0" long x 1' 8" or 1' 9" wide on top x 9" to 1' 2" deep.
" Stables. See "Hay rack" and "Manger."					
Range, Cottage	-	-	-	-	2' 0" to 3' 2" wide.
" Hotel	-	-	-	-	6' 0" to 15' 0" wide.
" Kitchen	-	-	-	-	3' 6" to 7' 0" wide x 1' 8" to 1' 10" deep.
Restaurant table. See "Table."					
School. See "Art Student," "Assembly Hall," "Baths," "Bed," "Bedroom," "Bench," "Central Hall," "Children," "Class-rooms," "Cloak-peg," "Cookery," "Corridor," "Cu- bicle," "Dining," "Gangway," "Laboratory," "Laundry," "Lavatory," "Lecture," "Music," "Playground," "Urinals," "Water-closets," "Workshop."					
Seating Accommodation—					
* Church, Free Sitting (Adult)	-	-	-	-	1' 8" x 2' 3" deep.
" (Child)	-	-	-	-	1' 2" x 2' 3".
" Rented Sitting	-	-	-	-	1' 8" x 2' 10".
London theatres, &c., per spectator (chairs with arms or backs)	-	-	-	-	1' 8 x 2' 4".
" " per spectator (chairs without arms or backs)	-	-	-	-	1' 6" x 2' 0".
" " Gangway in front of seats	-	-	-	-	-
Sheep in Abattoir, per beast	-	-	-	-	6' 0" super.
* " in Shed (Shelter only), per beast	-	-	-	-	10' 0" super.
* " (water supply, per day)	-	-	-	-	1 gallon.
Sink	-	-	-	-	-
" Hospital	-	-	-	-	1' 8" x 1' 3" to 4' 0" x 2' 0".
" Slop -	-	-	-	-	1' 9" x 1' 3" to 3' 6" x 2' 0".
Slaughter-house (Killing Shed), average	-	-	-	-	1' 3" to 2' 9" long x 1' 6" to 1' 10" deep.
Soldier (in Barrack-room)	-	-	-	-	100' 0" x 50' 0".
* " (water supply, per day, for all purposes)	-	-	-	-	60' 0" super. 15 gallons.

				ACCOMMODATION.		DIMENSIONS.
Stables, Door	-	-	-	-	-	4' 0" wide.
" Fittings. See "Hayrack," "Manger."	-	-	-	-	-	
" Gangway behind Stalls	-	-	-	-	-	8' 0" to 10' 0" wide.
" Loose Box, Cavalry Stables	-	-	-	-	-	17' 0" x 12' 0".
" Ordinary	-	-	-	-	-	12' 0" x 10' 0" to 12' 0".
" Stall, Cavalry Stables	-	-	-	-	-	100' 0" super.
" " Infirmary "	-	-	-	-	-	130' 0" super.
" " Ordinary "	-	-	-	-	-	57' 0" to 63' 0" super.
" Water supply, per day, Artillery horse and carriage	-	-	-	-	-	10 gallons.
" " " " " Carriage (four wheels)	-	-	-	-	-	20 "
" " " " " " (two wheels)	-	-	-	-	-	8 "
" " " " " Cart (four wheels)	-	-	-	-	-	12 "
" " " " " Cavalry Horse (all purposes)	-	-	-	-	-	8 "
" " " " " Ordinary "	-	-	-	-	-	15 "
Stairs, London churches, lecture-rooms, &c.—	-	-	-	-	-	
Not exceeding 200 congregants	-	-	-	-	-	3' 6" wide.
200 to 400	-	-	-	-	-	4' 6" wide.
Per 100 additional	-	-	-	-	-	6" increase in width.
Maximum	-	-	-	-	-	9' 0" wide.
Stairs, London theatres, etc.: for the use of the audience—	-	-	-	-	-	
Not exceeding 300 people as users	-	-	-	-	-	4' 0" wide minimum.
Exceeding	-	-	-	-	-	5' 0" "
(N.B.—For further regulations, see p. 147.)	-	-	-	-	-	
Stairs, Public schools	-	-	-	-	-	4' 0" wide minimum.
Stoves, Gas Cooking	-	-	-	-	-	1' 2" x 1' 3" to 2' 3" x 2' 4".
" Grilling	-	-	-	-	-	2' 0" to 4' 0" wide x 1' 9" to 2' 0" deep.
" Ordinary	-	-	-	-	-	1' 3" x 1' 3" to 3' 2" x 4' 3".
Straw, per truss of 36 lbs.	-	-	-	-	-	6' 6" to 10' 0" cube.
Table, Restaurant, Circular top	-	-	-	-	-	1' 8" to 2' 4" diameter.
" " Straight "	-	-	-	-	-	3' 0" to 7' 0" x 1' 6" to 4' 0".

APPENDIXES.

APPENDIXES.



APPENDIX A.

LONDON BUILDING ACT, 1894, SECTION 80, GIVING THE RULES AS TO TREATMENT OF STAIRCASES IN CHURCHES AND CHAPELS, ETC., WITHIN THE ADMINISTRATIVE COUNTY OF LONDON.

THE following rules shall be observed with respect to new churches, chapels, meeting-houses, public halls, public lecture-rooms, public exhibition-rooms and public places of assembly, or additions or alterations by which increased accommodation is to be provided to existing churches, chapels and meeting-houses, public halls, public lecture-rooms, public exhibition-rooms or public places of assembly :—

(*a.*) Every staircase for the use of the public shall be supported and enclosed by brick walls not less than 9 in. thick. The treads of each flight of stairs shall be of uniform width.

(*b.*) No staircase, internal corridor or passage-way for the use of the public shall be less than 4 ft. 6 in. wide. Provided that where not more than two hundred persons are to be accommodated in such church, chapel, meeting-house, hall, lecture-room, exhibition-room or place of assembly, such staircase, internal corridor or passage-way may be of the width of 3 ft. 6 in.

(*c.*) Every staircase, corridor or passage-way for the use of the public, and which communicates with any portion of the building intended for the accommodation of a larger number of the public than four hundred, shall be increased in width by 6 in. for every additional one hundred persons until a maximum width of 9 ft. be obtained. Provided always that in every case

where the staircases are 6 ft. wide and upwards, they shall be divided by a handrail. Provided also that in lieu of a single staircase, corridor or passage-way of the width in this sub-section prescribed, it shall be lawful to substitute two staircases, corridors or passage-ways, each being of a width at least equal to two-thirds of the width in this sub-section prescribed for the single staircase, corridor or passage-way, but so that neither of such two substituted corridors, staircases or passage-ways shall be less than 3 ft. 6 in. wide.

(*d.*) In all cases where a portion of the public is to be accommodated over or at a higher level than others of the public, a separate means of exit of the width above prescribed for staircases, internal corridors or passage-ways, and communicating directly with the street or open space, shall be provided from each floor or level.

(*e.*) All doors and barriers shall be made to open outwards, and no outside locks or bolts are to be affixed thereto.

APPENDIX B.

LONDON COUNTY COUNCIL.

THE METROPOLIS MANAGEMENT AND BUILDING ACTS AMENDMENT ACT, 1878.

THE PROTECTION OF THEATRES, ETC., FROM FIRE.

REGULATIONS MADE BY THE COUNCIL ON THE 30TH JULY 1901, WITH
RESPECT TO THE REQUIREMENTS FOR THE PROTECTION FROM
FIRE OF THEATRES, HOUSES, ROOMS, AND OTHER PLACES
OF PUBLIC RESORT WITHIN THE ADMINISTRATIVE COUNTY OF
LONDON.

THESE regulations shall, unless otherwise specified, apply to all theatres, houses, rooms, or other places of public resort within the Administrative County of London, to be hereafter constructed and to be kept open for the public performance of stage-plays, and to all houses, rooms, or other places of public resort within the said County, to be hereafter constructed and to be kept open for public dancing, music, or other public entertainment of the like kind, under the authority of letters patent from His Majesty the King, his heirs or successors, or of Licenses by the Lord Chamberlain of His Majesty's Household, or by the London County Council.

In these regulations the expression "such premises" means a theatre, house, room, or other place of public resort to be kept open for any of the purposes aforesaid.

1. Every person who shall be desirous of obtaining authority

to open any such premises within the said County, shall first make public his intention to erect such premises by exhibiting a notice-board on the proposed site in such a position that it can be plainly seen from the public way, or by advertisement in three newspapers circulating generally throughout the county or throughout the locality in which it is proposed to erect such premises, and shall then make an application in writing to the Clerk of the Council for a certificate under the Metropolis Management and Building Acts Amendment Act, 1878. For the purposes of the advertisement, differently dated issues of one paper shall count as different papers. The notice-board shall be maintained until the application has been dealt with by the Council. No application will be considered before the expiration of one fortnight after the receipt by the Clerk of the Council of a copy of the notice exhibited on the site or of each of the newspapers containing the advertisement.

The application shall contain a statement as to the nature and extent of the interest of such person in such premises, and the character of the entertainment for which such premises are proposed to be used. The application shall be accompanied by complete plans, elevations, and sections in duplicate, drawn on the dull side of tracing linen, to a scale of $\frac{1}{8}$ in. to a foot; and by a block plan on a separate sheet showing the position of such premises in relation to any adjacent premises, and to the public thoroughfares upon which the site of such premises abuts, drawn to a scale of not less than $\frac{1}{20}$ in. to a foot.

A plan and section of the drains proposed to be laid from such premises shall be submitted at the same time, and such plan shall indicate the sewer or sewers to which the drains are to be connected, and the section shall show the surface level of the street, the level of the lowest portion of the premises which is to be drained, and the level of the sewer or sewers. All levels shall be given in relation to ordnance datum.

All drawings shall be coloured to distinguish the materials employed in the construction of the building.

The width of all staircases, and the number of stairs in each,

the width of corridors, gangways, and doorways, together with the heights of the tiers and other parts of such premises, shall be indicated on such drawings.

The thickness of the walls and scantlings of the various materials shall be clearly shown on such drawings by figured dimensions.

The cardinal points shall be marked upon each plan.

The plans shall show the respective numbers of persons to be accommodated in the various parts of such premises, and the area to be assigned to each person, and shall be accompanied by a specification of the works to be executed, describing such of the materials to be employed and the mode of construction to be adopted as may be necessary to enable the Council to judge whether the requirements of these regulations will, when such premises have been completed, be complied with.

In the case of schools and halls used for parochial or mission purposes, and having a superficial area for the accommodation of the public of not more than 1,000 sq. ft., elaborate drawings will not be required, but sufficient detail shall be given to indicate the part of the premises to be used for public entertainments and the surroundings.

One copy of such drawings and specification will be returned to the applicant, if it is so desired, but the other copy shall remain the property of the Council.

2. One-half at least of the total length of the boundaries of the site of any such premises which consist of an entire building, and in case of a room or other such premises not consisting of an entire building, one-half at least of the total length of the boundaries of the site of the building of which such room or other such premises form part, shall abut upon or front to public thoroughfares, of which one thoroughfare at least shall not be less than 40 ft. wide, and of the remainder none shall be less than 30 ft. wide if a carriageway, or 20 ft. wide if a footway. These widths shall continue for the whole length of the roads between the nearest thoroughfares in each direction connecting therewith. The frontage of the site to a thoroughfare not less

Frontage and
external
passages.

than 40 ft. wide shall not be less than one-sixth of the total length of the boundaries of the site.

If, in order to comply with No. 10 of these regulations, an additional passage or way should be necessary, it may be provided by means of a private passage or way.

Such passage or way shall not be less than 10 ft. wide, and shall be under the complete control of the owner of such premises, and, if less than 20 ft. wide, no doors or other openings of the adjoining premises shall communicate therewith or overlook any portion of such passage or way.

3. No such premises, in which a stage will be erected and in which scenery will be used, shall be constructed underneath, or on the top of, any part of any other building, nor shall such premises contain living rooms.

4. No openings shall be allowed in the walls or roof of such premises within 20 ft. of any adjoining property unless a brick wall of the thickness prescribed by the Building Act be erected between such premises and the adjoining property to such a height that no part of any opening either in such premises or in any building which may be erected on such adjoining property shall be higher than the part of the wall immediately opposite to it. A similar wall shall be erected between any openings in such premises and any inflammable structure, erection, or material on any adjoining property.

5. All such premises shall be enclosed with proper external or party walls of brick or stone.

The thickness of all external party or cross walls shall not be less than the thickness prescribed by the London Building Act, 1894 (clause 12 of Part II. of the 1st Schedule to such Act excepted), for walls of similar height and length in buildings of the warehouse class, or such greater thickness as shall be required by the District Surveyor or the Tribunal of Appeal under section 78 of the London Building Act, 1894.

Where such premises are part of another building they shall be cut off from such other building by party walls and party structures of fire-resisting materials in a manner to be approved

Distinctive
site.

As to openings
in walls.

Walls.

by the Council, and no part of such premises shall overlook any portion of the adjoining part which may be liable to communicate fire to such premises.

6. In all such premises the floors, tiers, and roof of the auditorium, and all parts used by the public, shall be constructed of fire-resisting materials to the satisfaction of the Council, and the flooring, if of wood and not laid on solid foundations, shall be laid with iron tongues.

Fire-resisting floors, tiers, and roof.

7. No such premises shall have more than three tiers or horizontal divisions including the gallery, above the level of the pit.

Tiers.

Where the front seats of any tier are separated from the other seats by a partition, such seats shall not count for the purpose of this regulation as a separate tier.

8. Where the first tier or balcony of such premises extends over the pit, stalls, or area, the height between the floor of the pit and the first tier shall not be at any part less than 10 ft.; the height between the floor of the highest part of the gallery and the lowest part of the ceiling over the same shall not be less than 12 ft. The height between the tiers shall in no case be less than 8 ft.

9. In all such premises the floor of the highest part of the pit, or of the stalls where there is no pit, shall not be more than 6 in. above the level of the street at the principal entrance to the pit, and the lowest part of the floor of the pit or stalls shall not be lower than the level at which it can be effectually drained by gravitation into a public sewer, nor more than 15 ft. below the level of the street at the principal entrance to the pit.

Pit.

In any case the lowest floor shall not be placed at such a level as will render it liable to flooding, and such premises shall be efficiently and properly drained to the satisfaction of the Council.

10. In all such premises two separate exits shall be provided from every tier or floor which accommodates not more than 500 persons, and where a tier or floor accommodates more than 500

Entrances and exits.

persons, an additional exit shall be provided for every 250 or part of 250 persons above 500. Each of such exits shall be not less than 5 ft. wide between the walls at any point or between the leaves of the doors when open. Two of the exits from each tier or floor shall deliver into different thoroughfares or ways.

In the case of a tier or floor not accommodating more than 300 persons, two 4 ft. exits will be required.

If any tier or floor shall be divided into two or more parts, exits as set out above shall be provided from each of such parts.

In calculating the number of persons which can be accommodated in any tier or part of a tier of such premises, the standing space from which a view of the performance can be obtained (with the exception of that afforded by the intersecting gangways)* will be considered as well as the seated area.

Exits shall be arranged so as to afford a ready means of egress from all parts of each tier or floor, and shall lead directly into a thoroughfare or way.

It shall be compulsory on the management of such premises to allow the public to leave by all exit doors.

11. Every lobby, corridor, or passage in such premises intended for the use of the audience shall be formed of fire-resisting materials, and shall be at the narrowest point when finished of the widths specified in No. 10 of the regulations for exits.

Where possible, inclines shall be used instead of steps, but no corridor, passage, or gangway shall be inclined to a steeper gradient than 1 in 10.

There shall be no recesses or projections in the walls of such corridors or passages within 5 ft. of the floor.

12. Where vestibules are provided in such premises, not more than three tiers or floors or (where such tiers or floors are divided into two or more parts) not more than three of such parts of tiers or floors shall communicate with one vestibule.

* The words in parenthesis were inserted by order of the Council on 4th February 1902.

The aggregate width of all the doorways or passages that lead from a vestibule towards a thoroughfare or way shall be at least one-third greater than the aggregate width of all the exits required by the regulations that lead to such vestibule.

13. The corridors in such premises shall not be used as Cloak-rooms. cloak-rooms, and no pegs for hanging hats and cloaks shall be allowed therein.

Where cloak-rooms are provided, they shall be so situated that the persons using them shall not interfere with the free use of any exit way.

14. All staircases in such premises intended for the use of Staircases. the audience from any tier or part of a tier accommodating not more than 300 persons shall be at least 4 ft. wide at their narrowest parts, and those intended for the use of the audience from any tier or part of a tier accommodating more than 300 persons shall be at least 5 ft. wide at their narrowest parts.

All such staircases shall have solid square (as distinguished from spandril) steps and landings of York or other approved stone, or of such other fire-resisting material and construction as the Council may in any special case approve, with treads not less than 11 in. wide and with risers not more than 6 in. high (each lapping at least 1 in. over the back edge of the step below it), without winders, in flights of not more than fifteen or less than three steps each.

The treads and risers of each flight of steps shall be of uniform width and height, and the steps shall be pinned into brick walls at both ends.

The several flights of such steps shall be properly supported and enclosed to the satisfaction of the Council.

No staircase shall have more than two flights of fifteen steps each without a turn, the depth of the landing between such flights being at least the same as the width of the staircase.

All landings shall be 6 in. thick.

Every staircase shall have a roof of fire-resisting materials to be approved by the Council.

A continuous and uninterrupted handrail shall be fixed on

both sides of all steps and landings, supported by strong metal brackets built into the wall, but such handrails shall not project more than 3 in.

Where the flights of steps re-turn, the newel wall shall be chased so as to allow the handrail to turn without projecting over the landing.

There shall be no recesses or projections in the walls of such staircase within 5 ft. of the floor, and any gas or electric light fittings shall be at least 6 ft. 8 in. above the steps or landings.

15. All doors in such premises used by the public as exit doors shall, except where otherwise approved, be hung in two folds, and be made to open outwards towards the thoroughfare or way.

All internal doors shall be hung so as not to obstruct, when open, any gangway, passage, staircase, or landing.

No door shall open immediately upon a flight of steps, but a square landing at least 3 ft. in width shall be provided between such steps and such doorway.

All exit doors, having fastenings, shall be fastened by automatic bolts only, of a pattern and in a position to be approved by the Council; but where such doors are also to be used by the public for entrances, they may be fitted with lever or other approved fastenings in approved positions. Doors so fitted however, must not be fastened during the presence of the public.

All doors and all gates used for entrances shall be made to open both ways, and shall, when opened inwards, be so fitted that they can be locked back against the wall in such a manner as to require a key to release them.

All doors leading from exit passages, staircases, or corridors to the other parts of the building shall be hung so as to be closed by the stream of persons passing from the auditorium to the street, and be fitted with springs. No door handles or other fittings shall project into exit ways more than 1 in. when the doors are open.

All barriers and internal exit doors shall be made to swing or to open outwards, with no other fastenings than automatic bolts

No locks, monkey-tail, flush or barrel bolts, or locking bars, or other obstructions to exit, other than as before mentioned, shall be fitted on any doors, gates, or barriers.

16. All exit and other doors or openings in such premises used by the public for the purposes of exit shall be indicated by notices clearly painted to the satisfaction of the Council in 7-in. letters. Exit, &c.,
notices.

Such notices shall, where possible, be painted over such doors or openings at a height of at least 6 ft. 9 in. above the floor.

The words "no exit" shall be clearly painted to the satisfaction of the Council in 7-in. letters at least 6 ft. 9 in. above the floor, over all doors or openings, which are in sight of the audience, but which do not lead to exits.

17. Passages or gangways not less than 3 ft. 6 in. wide shall be formed leading direct to the exit doors, and gangways 3 ft. 6 in. wide shall be provided, intersecting the rows of seating in such a manner that no seat shall be more than 10 ft. from a gangway measured in the line of the seating. Gangways.

18. No enclosure shall be allowed in any such premises where the public can assemble for any other purpose than to view the performance, except so far as the Council shall consider necessary for the provision of refreshment-bars, or in the case of a theatre for the provision of a foyer. Internal
enclosures.

19. The seating area assigned to each person shall not be less than 2 ft. deep and 1 ft. 6 in. wide in all parts of the house where no backs or arms are provided to the seats, and not less than 2 ft. 4 in. deep by 1 ft. 8 in. wide where backs or arms are provided. In all cases, however, there shall be a space of at least 1 ft. in depth between the front of one seat and the back of the next measured between perpendiculars. Seating.

20. Where chairs are used in such premises, they shall be battened together at a distance of not less than 1 ft. 8 in. from centre to centre, where they have arms, and 1 ft. 6 in. where they are without arms, and in lengths of not less than four or more than twelve in a section. Chairs.

Proscenium
wall.

21. In all such premises where a stage with a proscenium will be erected, such stage shall be separated from the auditorium by a brick proscenium wall not less than 13 in. in thickness, and such wall shall be carried up the full thickness to a height of at least 3 ft. above the roof, such height being measured at right angles to the slope of the roof, and shall be carried down below the stage to a solid foundation.

Not more than three openings shall be formed in the proscenium wall, exclusive of the proscenium opening.

No such opening shall exceed 20 sq. ft. in area. Each of such openings shall be closed with a wrought-iron door not less than $\frac{1}{4}$ in. thick in the panel, hung in a wrought-iron frame so as to close of itself without a spring, and with a 3-in. lap or with such other fire-resisting door and frame as may be approved by the Council.

No openings formed in the proscenium wall shall, at the lowest part, be at a higher level than 3 ft. above the floor of the stage.

All the decorations around the proscenium opening shall be constructed of fire-resisting materials.

Stage exit.

A separate exit shall be provided from the stage direct to a thoroughfare or way.

Stage lighting.

Wherever possible electric light shall be the only illuminant used for the stage.

Proscenium
screen.

22. The proscenium opening shall be provided with a fire-resisting screen to be used as a drop curtain, of such pattern, construction, and gearing, and with such arrangements for pouring water upon the surface of the screen which is towards the stage, as may be approved by the Council.

Stage.

23. The space above the stage shall be of sufficient height to allow of all scenes and of the fire-resisting screen being raised above the top of the proscenium opening in one piece and without rolling.

The roof over the stage shall not be of fire-resisting material or heavy construction, and shall be provided with an opening at the back thereof equal at the base to $\frac{1}{10}$ the area of the stage.

Such opening shall be glazed at the top and sides with sheet glass not more than $\frac{1}{12}$ in. in thickness, and be capable of being opened by the action of lowering the fire-resisting screen or by the cutting or burning of a cord, to an extent equal at least to the superficial area required at the base of the opening. Suitable exhaust cowls shall also be provided on the stage roof.

24. The floors of the flies of such premises shall be constructed of fire-resisting materials to the satisfaction of the Council. Flies.

Adequate means of escape shall be provided from the flies and the gridiron to the satisfaction of the Council. Gridiron.

25. Dressing-rooms shall be arranged in a separate block of buildings, or divided from such premises by party walls, with only such means of communication therewith as may be approved by the Council. Dressing-rooms.

All dressing-rooms and staircases leading thereto shall be constructed of fire-resisting materials, and shall be connected with an independent exit leading directly into a thoroughfare or way.

All dressing-rooms shall be adequately ventilated to the outer air by windows in the external walls.

No decoration, or construction for the purpose of decoration, shall be employed in such dressing-rooms which does not adhere without any cavities to the surface of the wall.

No dressing-rooms shall be situated more than one story below the street level.

The exit doors from the dressing-room block shall be fitted with automatic bolts only.

Sufficient and separate water-closet accommodation shall be provided for the use of the male and female artistes and orchestra, and urinal accommodation for the use of males. Such water-closets shall be constructed and arranged to the satisfaction of the local sanitary authority.

26. All workshops, store-rooms, wardrobe or painting rooms, in connection with such premises, shall be separated from such premises and from each other by brick walls not less than 9 in. Workshops, &c.

thick, and shall be placed in positions to be approved by the Council.

All openings in such walls shall be closed by fire-resisting doors as described in No. 21 of these regulations. Such doors may, however, be of such greater size as the Council may approve.

All such doors, if consisting of a single fold, shall be made to overlap the door frame at least 3 in. when closed; and, if made in two folds, such folds shall overlap each other, when closed, at least 3 in.

All floors and ceilings of such rooms shall be formed of fire-resisting materials.

All such rooms shall be ventilated by windows in the outer walls or otherwise to the satisfaction of the Council.

Sufficient and separate water-closet accommodation shall be provided for the use of the male and female workpeople, and urinal accommodation for the use of the male workpeople. Such water-closets shall be constructed and arranged to the satisfaction of the local sanitary authority.

27. All limelight tanks, boilers with engines, and dynamos with engines in connection with such premises, shall be placed in ventilated chambers or buildings of fireproof construction.

Such chambers or buildings shall be separated from such premises and from each other by brick walls and fireproof floors, and shall be enclosed upon one or more sides by external walls.

All openings between such premises and such chambers or buildings shall be fitted with fire-resisting doors as described in No. 21 of these regulations; such doors, however, may be of such greater size as the Council may approve.

28. All scene stores and property rooms in connection with such premises shall be enclosed by brick walls not less than 9 in. thick, and shall have floors and ceilings of fire-resisting materials.

All openings from such scene stores and property rooms to such premises shall be closed by fire-resisting doors as described in No. 21 of these regulations; such doors may, however, be of such greater size as the Council may approve.

Limelight
tanks, boilers,
and dynamos.

Scene stores,
&c.

29. All constructional ironwork in such premises shall, if considered necessary, be embedded in fire-resisting materials in a manner to be approved by the Council. Structural ironwork.

30. No soft wood or other inflammable wall linings, partitions, screens, or barriers shall be used in any part of such premises, and no cavities shall be left behind any linings. All woodwork of the stage shall be rendered non-inflammable or be hard wood. Non-flammable linings, etc.

31. All skylights and lantern lights in such premises which may be liable to be broken shall be protected by stout galvanised iron-wire guards, securely fixed on the outside of such skylights or lantern lights. Skylights, etc.

32. All such premises when lighted by gas shall have separate and distinct gas services and meters as follows :— Gas installations.

(a.) To the stage (wherever possible electric light shall be used);

(b.) To the auditorium ;

(c.) To the staircases, corridors, and exits.

Such meters shall be placed in properly ventilated chambers of fireproof construction, the openings to which shall be fitted with fire-resisting doors as described in No. 21 of these regulations.

All gas brackets shall be fixed without joints ; and all burners within reach of the audience shall be fitted with secret taps, and shall be efficiently protected by glass or wire globes.

All gas burners within 3 ft. of inflammable ceilings shall be fitted with consumers of uninflammable material to distribute the heat.

All gas pipes shall be made of iron or brass.

Where there is to be a stage or where scenery is to be used, the footlights or floats shall be protected by fixed wire guards.

The rows and lines, and gas burners in the wings (which must commence 4 ft. at least from the level of the stage), shall be protected by fixed iron-wire guards.

All battens shall be hung by at least three wire ropes, and shall be protected at the back by a solid metal guard and wire fixed to a stiff iron frame at such a distance from the gas jets that no part of the scenery or decoration can become heated.

All movable lights shall be fitted with flexible tubes, and the gas in every case shall be capable of being turned off by the tap on the stage as well as by that on the flexible tube.

All flexible tubes shall be of sufficient strength to resist pressure from without.

An indicating gas plate shall be provided at a convenient place at the side of the stage. A stopcock shall be provided outside such premises in order that the supply of gas may be cut off when necessary.

Oil or candle
lamps under
certain con-
ditions.

33. Additional means of lighting in such premises for use in the event of the gas or the electric light being extinguished, shall be provided for the auditorium, corridors, passages, exits, and staircases, by a sufficient number of oil or candle lamps, of a pattern to be approved by the Council, properly secured to an unflammable base, and placed, if possible, out of reach of the public. This shall not apply where there is a complete installation of both gas and electric light, or two complete systems of electric lighting from separate companies.

Such lamps shall be kept alight during the whole time the public are in such premises.

No mineral oils shall be used in such lamps.

Sun-burner.

34. If there be a sun burner in such premises, it shall be provided with a pilot light, which shall be placed so that such sun burner can be lighted from the stage.

Ventilation.

35. All parts of such premises shall be properly and sufficiently ventilated in a manner to be approved by the Council.

All openings for ventilation shall be shown on the plans, and described in the specification, which shall be submitted to the Council for its approval.

Water-closets,
etc.

36. Each part of all such premises used by the public shall be provided with sufficient and separate water-closet accommodation for the use of males and females, and urinal accommodation for the use of males. Such water-closets and urinals shall be constructed and arranged to the satisfaction of the local sanitary authority.

37. All such premises shall be provided with a sufficient number of hydrants, each of a diameter of not less than $2\frac{1}{2}$ in. ; such hydrants shall be connected by, at least, a 3-in. main with a water company's high pressure street main. Hydrants, etc.

Where such premises contain a large superficial area for the accommodation of the public, the size of the main supplying the hydrants shall be determined by the Council. A pressure of at least 30 lbs. on the square inch shall be maintained in the flies and upper tiers of such premises.

Each of such hydrants shall be provided with, at least, a 30-ft. length of hose with fittings of the Metropolitan Fire Brigade pattern, and shall be fitted with bibcocks for filling buckets. Three buckets filled with water shall be kept near each hydrant. Hand pumps or other small fire appliances shall be provided as required.

Where there is no constant supply of water, there shall be provided on the top of the proscenium wall, or at some other place to be approved by the Council, two cisterns, to be kept always filled with water.

Such cisterns shall be each capable of containing at least 250 gallons of water for every 100 persons of the audience to be accommodated in the building, and shall be properly protected from all danger from frost.

Fire mains shall be connected with such cisterns to hydrants to be fixed in such places and in such a manner as may be approved by the Council.

38. Every theatre, and, where considered necessary by the Council, all other premises licensed for public entertainments, shall be connected with the nearest fire brigade station by telephone alarm. The positions for such alarms and the number of points in the house shall be decided upon by the chief officer of the fire brigade. The installation and maintenance shall be carried out by the General Post Office at the cost of the lessee. Telephonic alarm installation.

39. All woodwork of stage, hangings, curtains, and draperies in such premises shall be rendered non-inflammable. Hangings, etc., to be non-inflammable.

Fire precau-
tions.

40. Blankets or rugs and buckets filled with water shall always be kept on the stage, in the flies, scene-stores, or wings, and in the immediate passages approaching the dressing-rooms of such premises, and attention shall be directed to them by placards legibly printed or painted and fixed immediately above them to the satisfaction of the Council.

Some person shall be held responsible by the management for keeping the blankets or rugs, and fire appliances ready for immediate use.

Hatchets, hooks, and other appliances for taking down hanging scenery in case of fire shall be always kept in readiness for immediate use.

The regulations as to fire shall be posted in some conspicuous place approved by the Council in such premises, so that all persons connected with such premises may be acquainted with such regulations.

Fireplaces
and stoves.

41. No fireplace shall be formed in any portion of the auditorium or stage of such premises.

All open fireplaces or stoves in any other part of such premises shall be protected by strong fixed iron-wire guards and fenders of not more than $1\frac{1}{2}$ -in. mesh completely enclosing the fire. A part of the guard or fender may be made to open for all necessary purposes.

Electric
lighting and
heating instal-
lations.

42. The electric lighting and heating apparatus shall be carried out to the satisfaction of the Council, and no work shall be commenced until the sanction of the Council has been obtained to what is proposed to be done. Copies of the Council's regulations on the subject can be obtained on application to the Clerk of the Council.

Note by Author.—These regulations, under date of 25th March 1902, are not given here in Appendix, as having but slight bearings on the plans.

Lightning
conductor.

43. Such premises shall, where considered necessary by the Council, be provided with a lightning conductor, to the satisfaction of the Council.

44. The Council reserves to itself the right from time to time, in any special case, to modify or dispense with these regulations.

Power to modify or dispense with these regulations.

All applications for dispensation or modification of these regulations shall be made in writing, addressed to the Clerk of the Council, and shall contain a statement of the facts of the particular case, and the reasons why it is desired to modify or dispense with these regulations as applicable.

45. When the premises have been licensed, the person or persons in whose name the license is granted by the Lord Chamberlain or the London County Council shall be held responsible for the due management of such premises, and for the safety of the public and his or their employees in the event of fire.

Responsibility.

46. No subsequent alterations shall be made to such premises without the sanction of the Council having been first obtained.

Additions or alterations to premises.

Notice of any intended structural addition to, or alteration of, any such premises shall be given in writing to the Clerk of the Council, and shall be accompanied by drawings, elevations and sections, block plan, and specification of the works to be executed similar to those required in the case of premises to be certified for the first time by the Council, and shall show such intended addition or alteration.

The Council will, if necessary, cause a fresh survey of such premises to be made.

No doors, bolts or other fastenings, obstructions to the means of egress, flap seats or other means of diminishing or stopping up the gangways, whether permanently or temporarily, shall be permitted.

Note.—The issue of the certificate referred to in these regulations does not preclude the Council from considering, on its merits, any application which may hereafter be made to it with respect to the licensing of the building for public entertainments.

APPENDIX C.

RULES TO BE OBSERVED IN PLANNING AND FITTING UP
PUBLIC ELEMENTARY SCHOOLS,
ISSUED BY THE BOARD OF EDUCATION, 1903.

PREFATORY NOTE.

THE following Rules are to be regarded as embodying the result of the experience of the Board of Education in school planning. They are intended to show Education Authorities, School Managers, and their Architects what the Board deem essential in the construction and design of school buildings, but in other respects they are not meant to restrict liberty of treatment.

Every part of a school building should be thoroughly adapted to the work of school teaching. Such a building, therefore, must be provided with an ample playground, must be of sufficiently solid construction, suitably lighted and warmed, and thoroughly ventilated without draughts. It must have a sufficient number of entrances and adequate cloak-room accommodation ; scrupulous care must be devoted to sanitary arrangements. The Rules which deal with these matters express in each case the principles to which the Board will expect all new buildings to conform.

The remaining Rules are intended to aid in the production of buildings which shall be compact, properly subdivided for class teaching, conveniently arranged for effective supervision by the principal teacher and for the movement of the children from the entrances to the class-rooms or from one class-room to another. They also indicate how to obtain the most economical school building.

No school should ordinarily be built to accommodate more than 1,000 to 1,200 children in three departments. No single department should accommodate more than 400 children. A

large school in three departments might conveniently be divided in the following proportions : Boys, 360 ; Girls, 360 ; Infants, 380. For departments of this size the most suitable plan is that of a Central Hall with the class-rooms grouped round it ; as a rule such a department would probably require seven class-rooms. Smaller departments may be planned conveniently with the class-rooms opening from a Corridor. For small schools a large room with one or more class-rooms will be sufficient. There should always be at least one class-room except in special cases.

Where the site is sufficiently large, open, and fairly level, the most economical plan is that of a school on a single floor. Such an arrangement is also preferable on educational grounds. In any case it is desirable that a school building should not be on more than two floors. A building on three floors is open to many objections, and should only be proposed in special circumstances, or on very costly sites.

Before instructing an architect, it is desirable that careful regard should be had to the size and circumstances of the school, and to the number and qualifications of the staff to be employed. These considerations will determine approximately the method of grouping the scholars for instruction, and on this will depend the number and the accommodation of the rooms of which the school building should consist.

The annual cost of maintenance should be borne in mind as well as the initial capital expense.

Before placing a school on the list of schools in receipt of Annual Grant, and before recognising any enlargements or alterations (other than minor alterations) of the premises of a school already on that list, the Board must be satisfied by the submission of plans, drawn in accordance with the prescribed requirements, that the Building Rules are complied with.

BYE-LAWS.

In addition to complying with these Rules, all plans must comply with the requirements of any Bye-Laws which may be in force in the District in which the School is situated.

REQUIREMENTS.

(Plans which do not fully comply with the following Requirements cannot be considered.)

I. A block plan of the site drawn in ink to a scale of 20 ft. to an inch. This plan must indicate :—

(a.) The position of the school buildings.

(b.) Outbuildings.

(c.) Playground.

(d.) Drains (collateral and main), with their fall and depth below ground.

(e.) Entrances.

(f.) Boundary walls, or fences, and their nature.

(g.) Roads.

(h.) The points of the compass.

(i.) The levels of the ground at the principal points.

N.B.—For approval of site alone, the plan should show (g) (h) and (i).

II. A plan of each floor of the school-rooms (and teacher's or caretaker's residence, if any) drawn in ink to a scale of 8 ft. to an inch. The internal fittings of the rooms (*fireplaces, groups of desks, etc.*) must be accurately shown. The plan should also state whether the rooms are intended for boys, girls, or infants.

In cases of enlargement, a plan showing the buildings as they exist is needed.

III. Sections and at least four elevations, also drawn in ink to a scale of 8 ft. to an inch. The ceiling, the positions of window-heads in relation thereto, and the mode of ventilation must be shown.

N.B.—(a.) Pencil drawings cannot be received, but coloured tracings in ink on tracing cloth may be submitted while plans are in the preliminary stage of pencil, so that suggested alterations can be adopted without difficulty or expense.

(b.) Diagrams are of no value and cannot be accepted.

(c.) In the case of enlargements or alterations, the whole site

and the existing building should be as accurately shown in every respect as the proposed changes, and in such a manner that any change of numbers can be ascertained.

(*d.*) All plans should be dated, the scales drawn on and dimensions figured.

IV. A section of the desk proposed to be used, drawn to a scale of $1\frac{1}{2}$ in. to a foot. (See Rule 15.)

V. A draft specification.

VI. An approximate estimate of the total expenditure proposed.

RULES.

1. *Planning*.—Every school must be planned so that the children can be seated in the best manner for being taught. The rooms must be grouped compactly and conveniently, so as to secure proper organisation and supervision.

It is important to remember that the accommodation of every room depends not merely on its area, but also on the lighting, the shape of the room (especially in relation to the kind of desk proposed), and the position of the doors and fireplaces.

The doors and fireplaces should be arranged so as to allow the whole of one side of any room to be left free for the groups of desks.

2. *Central Halls*.—A Central Hall should have a floor-space of about $3\frac{1}{2}$ but not exceeding 4 sq. ft. for each scholar for whom the school is recognised. The Hall must be fully lighted, warmed, and ventilated.

(*a.*) A single Central Hall may be provided for the joint use, at separate times, of two departments, provided that it is so placed as to be readily accessible from the class-rooms of each department.

(*b.*) Where outdoor space is not available, physical training should be given in the Central Hall (or Corridor). This purpose should be taken into consideration at the time when the building is planned. Since fixed gymnastic apparatus is unsuitable for

children under fourteen years of age, a separate gymnasium is not required, and cannot be approved.

3. *Corridors*.—Large schools not built with a Central Hall must be provided with a wide corridor giving access to the rooms.

A Corridor should be fully and directly lighted and ventilated, and from 8 to 12 ft. wide, according to the size of the school. Two or three of the rooms ought to be separated only by movable partitions, in order to secure flexible working.

4. *School-rooms*.—A school-room should never be designed for more than 100 children, and a room of even smaller size is desirable. The width should vary according to the kind and arrangement of the desks (Rule 16).

No school-room lighted from one side only can be approved. The gable ends should be fully utilised for windows, and there should be no superfluous windows opposite the teacher.

A school-room which has no class-room attached should not contain more than 600 sq. ft. of floor-space.

5. *Class-rooms*.—The number of class-rooms should be sufficient for the size and circumstances of the school.

(a.) The class-rooms should never be passage-rooms from one part of the building to another, nor from the school-rooms to the playground or yard. Both school-rooms and class-rooms must have independent entrances. Every room should be easily cleared without disturbance to any other room.

(b.) A class-room should not be planned to accommodate more than from 50 to 60 children; but in special cases somewhat larger rooms may be approved. The minimum size is 18 ft. by 15 ft., but if the desks are arranged parallel to the longer side of the room, the width should be not less than 16 ft. In the absence of supplementary light the measurement from the window-wall in a room 14 ft. high should not exceed 24 ft. 8 in.

(c.) The proportions of class-rooms should vary with the kind and arrangement of the desks; but a long and narrow room should always be avoided, and a room approximating to a square is most satisfactory.

6. *Accommodation*.—The accommodation of a school for older scholars is based upon the number of children who can be seated at the desks, arranged in accordance with Rule 16, provided that a minimum of 10 sq. ft. of floor space per child is obtained.

A Central Hall will not be counted in the accommodation, nor will a class-room for Cookery, Laundry, Manual Instruction, Drawing or Science.

7. *Walls, Floors, and Roofs*.—The walls of every room used for teaching, if ceiled at the level of the wall plate, must be at least 12 ft. high from the level of the floor to the ceiling; if the area of the room exceed 360 sq. ft. the height must be not less than 13 ft., and, if it exceed 600 sq. ft., then the height must be at least 14 ft.

(a.) The walls of every room used for teaching, if ceiled to the rafters and collar beam, must be at least 11 ft. high from the floor to the wall plate, and at least 14 ft. to the ceiling across the collar beam.

(b.) Great care should be taken to render the roofs impervious to cold and heat.

(c.) Roofs open to the apex are very undesirable. They can only be permitted where the roofs are specially impervious to heat and cold, and where apex ventilation is provided. Iron tie-rods are least unsightly when placed horizontally.

(d.) The whole of the external walls of the school and residence should be solid. If of brick, the thickness must be at least one brick and a half; and, if of stone, at least 20 in.; where hollow walls are proposed, one portion must have the full thickness required for a solid wall.

(e.) All walls, not excepting fence walls, should have a damp-proof course just above the ground line.

(f.) The vegetable soil within the area of the building should be removed, the whole space covered by a layer of concrete not less than 6 in. thick, and air bricks inserted in *opposite* walls to ensure a through current of air under floors for ventilation to joists.

(g.) Timber should be protected from the mortar and cement by asphalt or tar.

8. *Entrances*.—Entrances should be separate for each department and each sex. In large schools more than one entrance to each department is desirable. (See also Rule 9.) The principal entrances should never be through the cloak-room. Entrance doors should open outwards as well as inwards. A porch should be external to the school-room. An external door, having outside steps, requires a landing between the door and the threshold.

9. *Staircases*.—There must be separate staircases for each sex and each department. Every staircase must be fireproof, and external to the Halls, corridors, or rooms. Triangular steps or “winders” must not be used. Each step must be about 13 in. broad and not more than $5\frac{1}{2}$ to 6 in. high. The flights must be short, and the landings unbroken by steps. The number of staircases must be sufficient not only for daily use, but also for rapid exit in case of fire or panic. For any upper floor accommodating more than 250 a second staircase is essential.

10. *Cloak-rooms and Lavatories*.—Cloak-rooms should not be passages, and should be external to the school-rooms and class-rooms, with gangways at least 4 ft. wide between the hanging-rails, and amply lighted from the end. They should not be placed against the gable wall (see Rule 4). There should be separate ingress and egress so that the children can enter and leave the cloak-room without confusion or crowding. Hat-pegs should be 12 in. apart, numbered, and of two tiers. The lineal hanging space necessary to provide a separate peg for each child is thus 6 in. The hat-pegs should not be directly one above the other.

Thorough ventilation and disconnection are essential, so that smells are not carried into the school. Ample space is needed immediately outside a cloak-room.

Lavatory basins are needed (see Rule 14g). Girls' schools require a larger number than boys' or infants'.

A lock-up slop-sink, water-tap, and cupboard are desirable for the caretaker.

11. *Lighting*.—Every part and corner of a school should be fully lighted. The light should, as far as possible, and especially in class-rooms, be admitted from the left side of the scholars. (This rule will be found greatly to influence the planning, see Rules 4, 11*b*, and 12*a*). All other windows in class-rooms should be regarded as supplementary or for ventilation. Where left light is impossible, right light is next best. Windows full in the eyes of teachers or scholars are under no circumstances approved. In rooms 14 ft. high, any space beyond 24 ft. from the window-wall is insufficiently lighted. (See Rule 5*b*.)

(*a*.) Windows should never be provided for the sake merely of external effect. All kinds of glazing which diminish the light and are troublesome to keep clean and in repair must be avoided. A large portion of each window should be made to open for ventilation and for cleaning.

(*b*.) The sills of the main lighting windows should be placed not more than 4 ft. above the floor; the tops of the windows should as a rule reach nearly to the ceiling; the upper portion should be made to swing. The ordinary rules respecting hospitals should here be remembered. Large spaces between the window-heads and ceiling are productive of foul rooms.

(*c*.) Skylights are objectionable. They cannot be approved in school-rooms or class-rooms. They will only be allowed in Central Halls having ridge or apex ventilation.

(*d*.) The colouring of the walls and ceilings and of all fittings in the rooms should be carefully considered as affecting the light. This point and the size and position of the windows are especially important in their bearing on the eyesight of the children.

12. *Ventilation*.—The chief point in all ventilation is to prevent stagnant air; particular expedients are only subsidiary to this main principle.

Apart from open windows and doors there must be provision for copious inflow of fresh air, and also for the outflow of foul air at the highest point of the room. The best way of providing

the latter is to build to each room a separate air chimney carried up in the same stack with smoke flues. An outlet should be by a warm flue or exhaust, otherwise it will frequently act as a cold inlet. Inlets are best placed in corners of rooms furthest from doors and fireplaces, and should be arranged to discharge upwards into the room. Gratings in floors should never be provided. Inlets should provide a minimum of $2\frac{1}{2}$ sq. in. per child and outlets a minimum of 2 in. All inlets and outlets should be in communication with the external air.

Besides being continuously ventilated by the means above described, rooms should as often as possible be flushed with fresh air admitted through open windows and doors. Sunshine is of particular importance in its effects on ventilation and also on the health of children.

(a.) Although lighting from the left hand is considered so important, ventilation demands also the provision of a small swing window as far from the lighting as possible, and near the ceiling.

13. *Warming*.—The heat should be moderate and evenly distributed so as to maintain a temperature of from 56 to 60 degrees. When a corridor or lobby is warmed, the rooms are more evenly dealt with and are less liable to cold draughts. Where schools are wholly warmed by hot water, the principle of direct radiation is recommended. In such cases open fireplaces in addition are useful for extra warming on occasions, and their flues for ventilation always.

(a.) A common stove, with a pipe through the wall or roof, can under no circumstances be allowed. Stoves are only approved when—

(i.) Provided with proper chimneys (as in the case of open fires); (ii.) of such a pattern that they cannot become red-hot, or otherwise contaminate the air; (iii.) supplied with fresh air, direct from the outside, by a flue of not less than 72 in. super.; and (iv.) not of such a size or shape as to interfere with the floor space necessary for teaching purposes.

(b.) A thermometer should always be kept hung up in each room.

(c.) Fireplaces and stoves should be protected by fire-guards.

14. *Sanitary Arrangements.*—Water-closets within the main school building are not desirable, and are only required for women teachers. All others should be at a short distance and completely disconnected from the school. Privies should be fully 20 ft. distant.

(a.) The latrines and the approaches to them must be wholly separate for the two sexes. In the case of a Mixed School this rule especially affects the planning. Passages or corridors should not be used by both sexes; where such an arrangement is unavoidable, there must be complete supervision from the class-rooms by sheets of clear glass.

(b.) Each closet must be not less in the clear than 2 ft. 3 in. wide, nor more than 3 ft., fully lighted and ventilated, and supplied with a door. The doors should be at least 3 in. short at the bottom and at least 6 in. short at the top. More than one seat is not allowed in any closet.

(c.) The children must not be obliged to pass in front of the teacher's residence in order to reach their latrines.

(d.) The following table shows approximately the number of closets needed :—

				For Girls.	For Boys.	For Infants.
Under	30 children	-	-	2	1	2
„	50 „	-	-	3	2	3
„	70 „	-	-	4	2	3
„	100 „	-	-	5	3	4
„	150 „	-	-	6	3	5
„	200 „	-	-	8	4	6
„	300 „	-	-	12	5	8

There should be urinals in the proportion of 8 ft. per 100 boys.

(e.) Earth or ash closets of an approved type may be employed in rural districts, but drains for the disposal of slop and surface water are necessary. Cesspits and privies should only be used

where unavoidable, and should be at a distance of at least 20 ft. from the school. [Building Form "A," which may be obtained on application, gives suggestions as to their construction and arrangement.]

(f.) Soil-drains must always be laid outside the building (on a hard even bottom of concrete) in straight lines with glazed stoneware pipes, carefully jointed in cement and made absolutely watertight. A diameter of 4 in. is sufficient except for drains receiving the discharge of more than ten closets, when the diameter should be 6 in. The fall should never be less than 1 in 30 for 4-in., and 1 in 40 for 6-in. drains. An inspection opening or chamber should be provided at each change of direction, so as to facilitate cleansing the drain without opening the ground. Every soil-drain must be disconnected from the main sewer by a properly constructed trap placed on the line of drain between the latrines and the public sewer. This trap must be thoroughly ventilated by at least two untrapped openings; one being the 4-in. soil pipe carried up full size above the roof, and the other an inlet pipe connected with the side of the trap furthest from the public sewer. Automatic flushing tanks are desirable where trough-closets are used.

(g.) Waste pipes from sinks or lavatories should be first trapped inside and then made to discharge direct through an outer wall over a trapped gully.

15. *Water Supply*.—All schools should be provided with an adequate supply of wholesome drinking water.

In cases where such supply cannot be obtained from the mains of an Authority or Company authorised to supply water, care must be taken to ascertain that the supply proposed to be adopted is adequate in quantity, is of suitable character, and is not liable to pollution in any way, as *e.g.* by surface drainage, or by leakage from sewers, drains, cesspools, or other receptacles.

All water pipes should be so laid or fixed as to be properly protected from frost, and so that in the event of their becoming unsound the water conveyed in such pipes will not be liable to become fouled, or to escape without observation.

There should be no direct communication between any pipe or cistern from which water is drawn for domestic purposes, and any water-closet or urinal.

All water-closets and urinals should be provided with proper service cisterns, which, together with the outlet therefrom, should be capable of providing a sufficient flush.

Any cistern to be used for the storage of water should be watertight, and be properly covered and ventilated, and should be placed in such a position that the interior thereof may be readily inspected and cleansed.

16. *Desks.*—Seats and desks should be provided for all the children, graduated according to their ages, and placed at right angles to the window-wall. (See also Rules 4 and 11.) The seats should be fitted with backs.

An allowance of 18 in. per scholar at each desk and seat will suffice (except in the case of the dual desk), and the length of each group should therefore be some multiple of 18 in., with gangways of 18 in. between the groups and at the walls. In the case of the dual desk the usual length is 3 ft. 4 in., and the gangways 1 ft. 4 in.

(a.) No desks should be more than 12 ft. long. In an ordinary class-room five rows of long desks or six rows of dual desks are best; but in a school-room or room providing for more than sixty children, there should not be more than four rows of long desks or five rows of dual desks.

If a school-room is 18 ft. wide, three rows of long desks or four of dual desks may be used; if the width is 22 ft., the rows may be four and five respectively.

Long desks should be so arranged that the teacher can pass between the rows. Where dual desks are used this is not necessary, as the gangways give sufficient access; but the teacher should be able to pass behind the back row.

(b.) The desks should be very slightly inclined. An angle of 15 degrees is sufficient. The objection to the flat desk is that it has a tendency to make the children stoop. A raised ledge in front of a desk interferes with the arm in writing. The edge of

the desk when used for writing should be vertically over the edge of the seat.

(c.) Single desks are not necessary in an ordinary public elementary school, and in view of the additional expense involved, can only be approved under exceptional circumstances.

17. *Sites and Playgrounds*.—Every school must have an open airy playground proportioned to the size and needs of the school, and the site should, if possible, have a building frontage suitable to its area. A site open to the sun is especially valuable for the children, and important in its effects on ventilation and health. The minimum size of site is, in the absence of exceptional circumstances, a quarter of an acre for every 250 children, irrespective of the space required for a teacher's or caretaker's house, or for a Cookery or other Centre. If the school is of more than one story, this area may be proportionately reduced ; but a minimum unbuilt-on or open space of 30 sq. ft. per child should be preserved.

(a.) In the case of a Mixed School of large size, playgrounds should be separate for boys and girls, and should, where practicable, have separate entrances from the road or street.

(b.) All playgrounds should be fairly square, properly levelled, drained, and enclosed. A portion should be covered, having one side against the boundary wall. A covered-way should never connect the offices with the main building ; buttresses, corners, and recesses should be avoided.

(c.) An infants' school should have its playground on the same level as the school, and a sunny aspect is of special importance.

18. *Infants' Schools*.—Infants should not, except in very small schools, be taught in the same room with older children, as the methods of instruction suitable for infants necessarily disturb the discipline and instruction of the other scholars. Access to the infants' room should never be through the older children's school-room.

(a.) The partition between an infants' room and any other school-room should be impervious to sound, and there should

be no habitual means of direct communication other than an ordinary door.

(b.) An infants' school and playground must always be on the ground floor.

(c.) No infants' class-room should accommodate, as a rule, more than sixty infants.

(d.) A space in which the children can march and exercise should be provided. A Corridor intended for this purpose should not be less than 16 ft. wide.

(e.) The babies' room should always have an open fire, and should be maintained at a temperature of not less than 60 degrees.

(f.) In infants' schools an allowance of 16 in. per child at long desks will be sufficient. Dual desks should be 3 ft. long.

(g.) The accommodation of an infants' school is based upon the number of children who can be seated at the desks provided that a minimum of 9 sq. ft. of floor space per child is obtained.

(h.) Where an infants' class-room is attached to a school for older children, and there is no Corridor or Hall available, it is desirable that the class-room should have a larger floor space than 9 sq. ft. per child, and that provision should be made of sufficient space, free of desks, for exercise.

19. *Rooms for Cookery, Manual Instruction, &c.*—As a rule a single room for Cookery, or Laundry-work, or Manual Instruction, or Science, or Drawing, will serve for more than one school if provided as a Centre in a convenient position. Every such Centre should have its own lavatory and cloak-room.

Large schools, or schools of an exceptional type, may sometimes require special rooms for their exclusive use.

(a.) *Cookery.*—A Cookery-room should be capable of accommodating 12 to 18 at practice or 36 to 54 at demonstration at any one time. The larger size will require 750 super. ft. and 10,500 cub. ft. Provision for instruction in scullery work is necessary.

The sink should be placed in full view of the teacher and

children, and should be fitted with a cold water supply and a waste pipe.

There should also be a gallery or raised platform with desks to accommodate 36 to 54 children, according to the size of the room.

The floor space for practical work should afford about 20 sq. ft. for each scholar, and should not be encumbered with desks, cupboards, or stoves.

In Cookery-rooms the ventilation needs special arrangements. Where a gas stove is used, it may be necessary to have a pipe fixed to carry off noxious fumes. The temperature should not be allowed to rise above 70 degrees.

The apparatus for lessons in cookery should include such stoves and other appliances as are usually found in the homes of the children.

(b.) *Laundry-work*.—A Laundry should be of simple construction, and entirely apart from the ordinary school buildings.

The proper size for a Laundry is about 750 sq. ft. It should have a gallery or raised platform with desks for 42 children.

Laundry tables should be large enough to allow at least 3 ft. of space for each child when ironing.

The ventilation of rooms for laundry-work needs special arrangements for the removal of steam.

(c.) *Manual Instruction*.—In its plan, arrangements, construction, lighting and ventilation, a Manual Instruction room should be modelled on a workshop rather than on a school. The construction should accordingly be simple. The roof may be either of lean-to or other ordinary form, according to circumstances. Its height at the windows in front of the benches need not be more than 10 ft. The light must be ample. The temperature should not be so high as in an ordinary class-room. A flat ceiling is not, as a rule, necessary. Ample ventilation should be provided by inlets at a height of 5 ft. from the floor, and by outlets at the highest point. A Manual Instruction room for 20 scholars should have a floor space of about 700 sq. ft.

(d.) *Science-room*.—A room suitably fitted for elementary practical work in Science may be provided for the use of one

large or several contributory schools. Such a Science-room should not, as a rule, contain more than 600 sq. ft. of floor space. It should be fitted with strong and plain tables, sinks, cupboards, and shelves, and where necessary, a fume closet. A proper supply of gas is necessary.

In addition to a Science-room, one of the ordinary class-rooms may be fitted with a simple demonstration-table and gas and water supply. But a special lecture-room cannot be approved in an ordinary public elementary school.

(e.) *Drawing Class-rooms.*—A Drawing class-room can only be sanctioned where it is likely to be used for a reasonable time every week by the scholars from one large or several contributory schools. A suitable size for such a room is 600 sq. ft. of floor space. Light should be admitted at a suitable height and angle from the North, North-East, or East.

20. *Higher Elementary Schools.*—For a Higher Elementary School accommodating from 300 to 350 scholars, ten class-rooms will generally be required, since every class should have its own class-room. No class-room should accommodate more than 40 scholars.

(a.) i. The class-rooms may be furnished with single or dual desks as may be desired. Single desks should be 2 ft. long, arranged in pairs with intervals of 2 in. and gangways of 2 ft.

ii. If single desks are adopted, a class-room should have an area of about 16 sq. ft. per scholar. Class-rooms fitted with dual desks need not be so large, but a minimum of about 13 sq. ft. per scholar will be required.

(b.) Every Higher Elementary School should be provided with suitable laboratories.

i. The laboratory accommodation must be sufficient to provide at one time for the largest class in the school.

ii. There should generally be one laboratory for chemistry and one for physics.

iii. A laboratory should afford 30 sq. ft. of floor space for each scholar; the minimum size will therefore be 600 sq. ft., but it is as a rule desirable that the laboratory should be somewhat

larger. If, however, the laboratory accommodates more than 25 scholars, a second teacher would be required.

iv. Laboratories must be fitted with suitable tables, which must be well lighted; they should be properly supplied with gas and water. For chemical laboratories, sinks, cupboards, and the necessary fume closets must be provided.

v. A small balance-room may be provided if desired.

(c.) i. In addition to the class-rooms and laboratories, a Higher Elementary School may include a lecture-room, which should be fitted with a demonstration-table (furnished with a gas and water supply and a sink) and a fume closet. A lecture-room should have an area of about 750 sq. ft.

ii. If no separate lecture-room is provided, each of the class-rooms used by the third and fourth years should be fitted with a simple demonstration-table.

iii. A small preparation-room, fitted with bench, sink, cupboard, and shelves, and proper supply of gas, should be provided in a convenient position.

(d.) A drawing class-room for the more advanced drawing is desirable. It should provide 30 sq. ft. of floor space for each scholar; the best size will be a room with an area of 750 sq. ft. If suitably lighted, the Hall would answer for this purpose.

(e.) Other special rooms for Cookery, Laundry-work, and Manual Instruction should be provided in accordance with Rule 19.

(f.) A Higher Elementary School should be planned with a Central Hall; but no class, other than drawing, can be recognised in such a hall.

21. *Teacher's House*.—The residence for the master or mistress should contain a parlour, a kitchen, a scullery, and three bedrooms, and the smallest dimensions which the Board can approve are:—

For the parlour	-	14 ft. by 12 ft.	} of super- ficial area	{	9 ft.	} in height to wall-plate.
„ „ kitchen	-	12 ft. by 12 ft.			9 ft.	
„ one of the bedrooms		14 ft. by 12 ft.			8 ft.	
„ two other bedrooms		12 ft. by 8 ft.			or 7 ft. to wall-plate and 9 ft. to ceiling.	

(*a.*) The residence must be so planned that no room is a passage-room, and that the chimneys are not all on the external walls.

(*b.*) There must be no internal communication between the residence and the school.

(*c.*) Windows should be carried up as nearly to the ceiling as practicable.

(*d.*) There must be a separate and distinct yard with offices.

(*e.*) No dwelling-house should be built as part of the school-house.

22. *Teachers' Rooms.*—In large Schools there should be provided for the use of the Teachers a small room or rooms with suitable lavatory accommodation. A store-room for books and other School material should adjoin the Teachers' room.

APPENDIX D.

RULES FOR NEW BUILDINGS AND EQUIPMENT
OF SECONDARY SCHOOLS,
ISSUED BY THE BOARD OF EDUCATION, 1903.

PLANS, SPECIFICATION, AND ESTIMATE.

ALL plans and specifications submitted for approval must be prepared by a professional architect.

The plans must show the building complete in all respects, in accordance with the following Rules. Omission of any item will cause unnecessary delay and trouble.

In cases where sufficient funds are not available for the immediate erection of the whole building, those portions not proposed to be carried out at once should be clearly indicated.

Duplicate copies of the block plan and of the plan of each floor must be sent for retention by the Board.

Note.—A distinction is observed throughout between requirements, which *must* be complied with, and recommendations, which *should* be adopted unless there are special reasons to the contrary.

1. *Plans.*—All plans, whether photographic prints or otherwise, must be on cloth. The scale must be drawn on all drawings as well as expressed in words, and all plans must show the North point.

(a.) A block plan of the site, to be drawn to a scale of 16 ft. to an inch, having the points of the compass marked upon it and the levels of the ground, and showing the position of the building, with boundaries, approaches, and abutments, and the course, size, and direction of all rain-water, sink, bath, water-closet, and other drains, the situation of all manholes and ventilating pipes, and the connection of the drains with the sewer or outlet.

The following plans, elevations, and sections must be drawn to a scale of $\frac{1}{8}$ in. to a foot. $\frac{1}{2}$ -in. scale drawings will be required of intricate roof or other construction.

(*b.*) A plan of each floor, including basement and attics (if any).

(*c.*) A plan of the roofs.

(*d.*) An elevation of each front.

(*e.*) Sections through each portion of the building showing the construction of roofs, floors, etc.

(*f.*) In the case of additions to existing schools, plans of each floor of the old buildings previous to alterations, including lavatories, latrines, etc., together with elevations and sections of the portions affected by the additions; the old buildings being coloured on the plans differently from the new.

The sizes of all rooms, both new and old, with the number to be accommodated in each, the footings to the foundations, the thickness of walls, the construction, and the scantlings of all timbers of floors and roofs must be accurately shown and figured; and the fittings, including desks, tables, basins, cupboards, laboratory sinks, benches, and the like, with the methods of heating and ventilation, must be clearly shown and described.

2. *Description.*—A concise description of the buildings, and of the various rooms, with their dimensions and uses. The total number of scholars of each sex for whom accommodation is proposed to be provided must be stated.

3. *Specification.*—The specification must contain full details, and have marginal references opposite the description of each important part of the building in the several branches of trade. It must be written on foolscap paper, and any corrections made to meet the Board's requirements must be written in red ink.

4. *Estimate.*—An estimate of cost, including all matters mentioned in the specification, with the architect's and quantity surveyor's remunerations appended as separate items, must accompany the plans and specification. The cubical contents of the building measured from the bottom of the footings to half-

way up the roof, and including chimney stacks, turrets, and other features, must accompany the estimate.

Note.—The architect to the Governing Body will be required to certify to the due completion of the works in accordance with the Board's requirements.

BUILDING RULES.

All minimum dimensions and areas given are irreducible.

I. DESIGN.

1. *Accommodation.*—When new buildings are to be erected for any of the purposes mentioned below, the minimum accommodation for each purpose must be as follows:—

Minimum
accommoda-
tion.

Assembly Hall	-	-	-	8 sq. ft. for every scholar up to 500 ; and 6 sq. ft. for every scholar above 500.
Lecture-room	-	-	-	14 sq. ft. for every scholar.
Class-room	-	-	-	18 sq. ft. for every scholar ; or 12 sq. ft. for every scholar, exclusive of a space for the master or mistress, which must be of the full width of the room and not less than 7 ft. 6 in. in length from the wall to the front row of desks.
Laboratory and Art-room	-			30 sq. ft. for every scholar.
Workshop or Cookery Class- room	-	-	-	40 „ „
Dining-hall	-	-	-	10 „ „
Dormitory	-	-	-	65 sq. ft. and 800 cub. ft. for every scholar.
Sick-room	-	-	-	1,000 cub. ft. for every bed.
Lavatory basins in Day Schools	-	-	-	1 for every 10 scholars up to 100 ; and 1 for every 15 scholars above the first 100.
W.C.'s :—				
In Day Schools	-	-		1 for every 15 girls ; 1 for every 25 boys and 1 Urinal for every 15 boys.
In Boarding Schools	-			4 for every 30 boarders for day use ; 1 for every 20 boarders for night use.
Baths in Boarding Schools	-			2 for every 25 scholars.

A good plan for baths is a room with a floor of asphalt, lead, or other impervious material, with taps and movable baths, or shower-baths.

2. *General Plan.*—The various rooms must be grouped compactly and conveniently, so as to secure proper organization and supervision. The accommodation in every room depends, not merely on its area, but also on the lighting, the shape of the room (especially in relation to the desks, benches, and other fittings), and the positions of the doors and fireplaces. General Plan

The best general plan is that of a Central Hall, round which the other rooms are arranged, and from which they are entered by doors, the upper portions of which are glazed. If an upper storey is needed, the staircases and corridors should be in view from the Central Hall. Passages and corridors should be avoided as far as possible. Where unavoidable, they must be large, airy, and well lit, and constructed of fire-resisting materials. Central Hall.

3. *Entrances and Exits.*—Entrances must not be direct into a Central Hall or other room; and must not be used as Cloak-rooms. For external doors having outside steps, there should be a landing between door and steps. External doors should open outwards. Entrances and Exits.

In schools of more than 150 scholars there should be more than one exit.

In Mixed and Dual Schools there must be a separate entrance for boys and girls.

4. *Staircases.*—Staircases must be not less than 4 ft. nor more than 6 ft. wide, and must not have more than fourteen steps to a flight. Where possible, they should be constructed with solid walls on both sides of the flights, and every staircase must have at least one external wall. They must be of fire-resisting materials, and well lighted in every part. In schools of more than 150 scholars with upstairs rooms, there must be at least two staircases. Staircases.

Treads must not be less than 11 in. wide, and risers not more than 6 in. high. Winders should be avoided.

5. *Cloak-rooms, Lavatories and Changing-rooms.*—In every

Cloak-rooms,
Lavatories
and Changing-
rooms.

School there must be Cloak-rooms, Lavatories and Changing-rooms. They must not be passages. They should be entered from properly lighted and ventilated lobbies, and must not be entered from any room used for teaching. They must be heated and ventilated so as to dry wet things and prevent any smells or damp from entering the school. Lavatory fittings should not be placed in Cloak-rooms.

In Mixed Schools there must be separate Cloak-rooms and Lavatories for boys and girls.

Cloak-rooms should be well lighted from the end. Gangways at least 4 ft. wide should be made between the hanging-rails and seats. Pegs for hats and cloaks should be numbered, placed not less than 12 in. apart, and not placed one above another. In Lavatories, slate troughs with loose not fixed basins are recommended. The floors should be of asphalt or other impervious material, and the walls of glazed brick or tile or with at least a dado of 5 ft. high of such materials. Glazed partitions should be used as far as possible. Changing-rooms should be provided with fixed seats, pegs, lockers and boot-racks. In small Day Schools accommodation for changing may be provided in the Cloak-room.

6. *Assembly Hall*.—The Central or Assembly Hall should not be used as a Class-room, except for drawing. If it is found necessary to use the Hall as a Class-room, it must never be used for more than one class at once.

Class-rooms.

7. *Class-rooms and Lecture-room*.—In every School there must be Class-rooms at the rate of one for every 25 scholars. There must be in the Class-rooms, accommodation for the whole of the scholars in addition to that provided in Laboratories; but a Lecture-room may be reckoned as a Class-room for not more than 30 scholars. No Class-room should contain more than 30 or less than 15 scholars. All Class-rooms must be furnished with single desks, not less than 2 ft. long, with adequate gangways, so arranged that the teacher can pass alongside or behind each row. A Lecture-room should accommodate not less than 30 scholars, and may be large enough to hold more, and should be

Lecture-
room.

constructed as far as possible on the principle of a theatre, with rising seats. Class-rooms should not have rising seats.

The principal light must be to the left hand of the scholars. Lighting.
Windows must never be placed so as to front scholars or teachers

Desks may conveniently be arranged so as to allow a space of 3 ft. by 2 ft. for each, including the space between the front of one and the back of that next in front of it, with gangways of not less than 18 in. wide, and a space of at least 1 ft. between the back row of desks and the wall.

8. *Laboratories and Science Lecture-room.*—In every School there must be one or more Laboratories, and there should be a Science Lecture-room, or a Class-room fitted for experimental demonstration. A Laboratory should accommodate not less than 15 nor more than 25 scholars at a time at practical work, but in large schools of more than 200 may accommodate more, if arrangements are made for supervision by more than one teacher at a time.

Laboratories
and Science
Lecture-
room.

Laboratories should be thoroughly well lighted and properly fitted with benches for their special purpose, and supplied with water, gas, and, where possible, electric current. In a Chemical Laboratory there must be special provision by way of fume closets, a hood over a bench, or otherwise, for experimental work involving noxious fumes. A Physical Laboratory should be free from vibration, and for that purpose placed on the ground floor, where possible, and should be capable of being darkened. If there is no Balance-room, a separate place in the Laboratory should be assigned for balances. If on an upper storey, the floor should be free from vibration and impervious to sound. Store, Preparation, Balance, and Dark Rooms should be provided where possible.

9. *Drawing and Art Rooms.*—In every School there should be a room or rooms properly constructed and fitted for the study of Drawing and Art, with accommodation for at least 15 Elementary and 15 Advanced students. If the School is of more than one storey, these rooms must be at the top.

Drawing and
Art rooms.

The following dimensions will afford suitable provision for 50 scholars :—

Drawing and
Art rooms.

(a.) One room for Elementary Drawing 25 ft. by 30 ft. It may be lighted by skylights as well as side windows.

(b.) One room for Advanced Drawing and Art not less than 25 ft. by 30 ft. This room should be lighted from the north side by a single large window square at the top, to give as much light as possible. The window may be carried up in a dormer if necessary, and its top should be at a height from the floor equal to three-quarters the depth of the room.

The following equipment and apparatus should be provided :—

(a.) A sufficient number of single desks, with wire or other receptacles for holding pots or glasses of water, and movable appliances for the support of drawing copies.

(b.) A suitable boarded or other surface fitted round the walls at a convenient height for blackboard practice.

(c.) A rack with numbered compartments for drawing-boards.

(d.) Stands for displaying casts and drawing models or objects.

(e.) A cupboard for storing examples and exercises.

(f.) A movable blackboard and a whiteboard with all requisites for demonstrations by teachers.

(g.) Some frames, glazed and with movable backs, for displaying examples of good Art work.

Cookery
Class-rooms.

10. *Cookery Class-rooms.*—In Cookery Class-rooms it is convenient to have two ranges, one open and the other closed, arranged on a slight cant across the angles at one end of the room, with a dresser between them. Where gas is available, a gas stove provided with a flue to carry off fumes, should be fixed in a convenient position against the side wall, if possible in a line with the table to be used for demonstration purposes. Provision for scullery work must be made, and the sink should be placed in full view of the teacher and scholars. If floor space permits, raised benches should be placed at the end of the room opposite the ranges and dresser. Kitchen tables should be provided, allowing 2 ft. 6 in. square for the use of each scholar

in classes for practical work. Special arrangements should be made for ventilation, and the temperature should not be allowed to rise above 70 degrees. A Cookery-room should be so placed that smells from cooking will not be liable to enter other parts of the School. There should be accommodation for at least 15 scholars.

11. *Workshops*.—In every School there *should* be, and in every Boarding School with more than 20 boarders there *must* be, a Workshop or Manual Training Room, well lighted and ventilated, which should provide for not less than 15 nor more than 20 scholars under instruction at one time. For metal-working there should be not less than 4 ft. run of bench for every scholar. For wood-working, benches about 5 ft. long by 2 ft. 6 in. wide are recommended. There should be a space of at least 4 ft. in width between benches, and a clear space round every bench for wood-working. A rack for tools should be provided for every bench. Workshops.

Provision for blackboard teaching should be made.

12. *Music-rooms*.—In every School there should be a Music Class-room, and attached to it Practice-rooms about 8 ft. by 6 ft. 6 in., divided by sound-proof partitions, and with sound-proof doors. These should be as much isolated as practicable. Music-rooms.

13. *Dining Halls and their Offices*.—In every School there should be proper Dining Halls for day scholars as well as for boarders, if any, and careful estimates should be made of the number of day scholars who may be expected to dine. Not less than 2 ft. should be allowed for every scholar at the table. The Kitchen and necessary offices should be adjacent to the Dining Hall, with separate entrance, and so placed that smells from cooking will not be liable to enter the School. Dining Halls, etc.

14. *Common-rooms*.—In every School there must be a Headmaster's or Headmistress's Room, and a Common-room for other Masters or Mistresses, and in every Boarding School a Common-room for the use of boarders out of school hours. Common-rooms.

15. *Library*.—In every School there *should* be, and in every Boarding School of more than 20 boarders there *must* be, a Library. Library.

Dormitories.

16. *Dormitories*.—There must be a space of not less than 3 ft. between beds. If the cubicle system is adopted, there must be a window to every cubicle. Masters' or Matrons' rooms should be placed so as to ensure some supervision over the Dormitories. Lavatories should not be fitted in the Dormitories.

Sick-rooms.

17. *Sick-rooms and Infirmarys*.—In every Boarding School there must be a Sick-room, properly isolated, with separate lavatory and latrine. In a Sick-room the beds must be free of the walls. There should be not less than 6 ft. space between beds, and, if possible, a window between every two beds, the windows being opposite each other. All internal angles of walls, floors, and ceilings should be rounded.

Water-closets and bath-room, with hospital bath, should be provided, with aerial disconnection from the Sick-room. In Boarding Schools of more than 50 boarders, provision for infectious cases should be made in a separate building as far from the main building as conveniently practicable.

Headmaster's House.

18. *Headmaster's House*.—The Headmaster's House, if any, should be planned as a gentleman's residence, with accommodation for a family, and, especially in the case of a Boarding School, for the entertainment of visitors. For the Headmistress in a Girls' School, proper apartments with reception-rooms should be provided.

Head-mistress's Rooms.

Boarding Houses.

19. *Boarding Houses*.—In every School for more than 80 boarders, there should be separate houses with accommodation, unless under exceptional circumstances, for not more than 50 in each house, under the charge of a master.

Gymnasium and Recreative provisions.

20. *Gymnasium, Playground, and Playfields*.—In every School there should be a Gymnasium and a Playground proportioned to the size and needs of the School. The Playground should be properly levelled, drained, and inclosed. There should be a covered shed for games for wet days. Buttresses, corners, and recesses should be avoided.

There should also be, where practicable, Playfields for

cricket and football, or, in the case of Girls' Schools, for hockey and lawn tennis.

In suitable cases, a shed for bicycles should be provided.

II. CONSTRUCTION.

N.B.—The cost of periodical repairs should always be borne in mind. Wood that requires frequent painting should only be used sparingly on the exterior, and in the interior glazed linings soon repay their extra first cost in the savings of renewals.

21. *Preparation of Site.*—All vegetable soil must be removed, and a layer 6 in. thick of cement concrete spread over the whole surface of the ground to be occupied by the buildings. Surface concrete.

22. *Foundations.*—Except where hard rock, gravel, or chalk bottom is found, concrete foundations must be provided under all new walls. They must be not less than 1 ft. thick nor project less than 6 in. beyond the lowest course of footings on either side. Foundations.

23. *Walls.*—All walls, including fence walls, must have a damp-proof course of asphalte, slate, or other approved material through their whole thickness immediately above the ground, and all chimney stacks must have a similar course immediately above the roof. Damp course.

All chimney stacks must be built in cement. Chimney stacks.

External walls where built solid must, if of brick, be at least $1\frac{1}{2}$ brick thick, and if of stone, 20 in. thick. In exposed situations external walls are better built hollow. If of brick, the external thickness should be 9 in., with a $4\frac{1}{2}$ in. lining and a 2 in. cavity. Where stone is used it should not be less than 14 in. thick, with a $4\frac{1}{2}$ in. brick lining and a 2 in. cavity. Thickness of walls and Hollow walls.

These minimum dimensions are for walls one storey high, and must be increased according to the height of the building.

Hollow walls must be bonded together with continuous courses of vitrified bonding bricks, one course to every 3 ft. in height.

Iron ties must not be used. Lead trays must be placed over all openings in hollow walls.

Height of
rooms.

The height of every room used for teaching must not be less than 12 ft. from the level of the floor to the ceiling. If ceiled to the rafters and collars, the height from floor to wall plate must be at least 11 ft. For an Assembly Hall, Dining Hall, Gymnasium, and other large rooms greater height should be given.

Air space.

An air space should be left round all timbers where they enter the walls, and they should rest on stone templates.

Rough cast
and cement.

Where local stone is rough or porous, rough cast may be used, but cement to imitate stone must not be used.

Roofs.

24. *Roofs*.—Roofs should not, if it can be avoided, be open to the apex. If, as in the case of Assembly Halls, they are so made, special precautions must be taken to render them impervious, and to provide apex ventilation.

Where a roof forms part of a room covering, a non-conducting air space should be introduced between the weather covering and the ceiling, and the backs of the rafters must be close-boarded.

Rafters and joists must not be more than 13 in. apart in the clear.

Spruce timber must not be used. All external woodwork must be of oak, teak, or best Baltic red fir.

Slates should be secured by strong copper nails, weighing not less than 10 lbs. per thousand, two to each slate. Ties should be secured by similar nails or by oak-pins, two to each tile. Ridge tiles should be bedded and jointed in cement.

Floors.

25. *Floors*.—Solid floors should be used on the ground floor. If joists and boarded floors are used, air-bricks or air-gratings must be inserted to ensure a through current of air.

Windows.

26. *Windows*.—The area of window glass must not be less than one-fifth the area of the floor space in rooms used for teaching, and in other rooms not less than one-eighth. At least half the glass area of every window must be made to open for ventilation and for cleaning. In rooms used for teaching, windows should have square heads, be as near the ceilings as possible, and be of white glass only. The height from floor to glass line should be from 4 ft. to 4 ft. 6 in. Provision for cross-ventilation should be made in each case.

A convenient arrangement of windows is to have the lower portion fitted as double hung sashes, and the upper as a fanlight hung at the bottom to fall inwards.

27. *Doors*.—All external doors must open outwards. A Doors.
doors to rooms used for teaching should be glazed in the upper part.

III. VENTILATION AND WARMING.

28. *Ventilation*.—In each room there must be, independently Ventilation.
of doors and windows, inlets for fresh air and outlets for foul air, communicating with the outer air.

Inlets should be placed as far as may be from doors and fire-places. They must not consist of gratings in floors.

Outlets for the extraction of foul air should be placed in such positions as are required by the system adopted.

Special attention must be paid to ventilation in Chemical Laboratories and Cookery-rooms.

29. *Warming*.—Warming may be done either by open fire- Warming.
grates (if possible arranged to admit fresh warm air), by hot-water pipes (in which case the principle of direct radiation is recommended), or by hot air. An even temperature of from 54° to 60° should be maintained.

IV. SANITARY ARRANGEMENTS.

30. *Closets*.—In Day Schools there should be no closets in Closets for:—
the main school building, except for women teachers and girls. Day Schools.
All others should be completely disconnected from the School at a short distance.

In Mixed or Dual Schools the offices and approaches to Mixed
them must be wholly separate for the two sexes. Schools.

In Boarding Schools there should be closets near the Dormi- Boarding
tories, but separated from them in cross-ventilated lobbies. Schools.

Each closet must be not less in the clear than 2 ft. 3 in. wide nor more than 3 ft., fully lighted and cross-ventilated. They are best divided by partitions carried up 6 ft. only. Doors, if any,

should be separated from the threshold by at least 4 in., and from the head by at least 6 in.

Cesspool.

If a cesspool system is unavoidable, the cesspool must be as far as possible removed from the playground, be fenced in, properly ventilated, and watertight.

Drains.

31. *Drains*.—The arrangement of drains should be in accordance with the best approved modern practice, subject to the regulations of the Local Sanitary Authority, or if none, subject to those of the nearest Urban Sanitary District Authority.

APPENDIX E.

EXTRACTS FROM THE BYE-LAWS MADE BY THE LONDON COUNTY COUNCIL UNDER SECTION 39 (1) OF THE PUBLIC HEALTH (LONDON) ACT, 1891, AND CONFIRMED BY THE LOCAL GOVERNMENT BOARD, 28TH JUNE 1893.

1. Every person who shall hereafter construct a water-closet or earth-closet in connection with a building shall construct such water-closet or earth-closet in such a position that, in the case of a water-closet, one of its sides at the least shall be an external wall, and in the case of an earth-closet two of its sides at the least shall be external walls, which external wall or walls shall abut immediately upon the street, or upon a yard or garden or open space of not less than 100 sq. ft. of superficial area, measured horizontally at a point below the level of the floor of such closet. He shall not construct any such water-closet so that it is approached directly from any room used for the purpose of human habitation, or used for the manufacture, preparation, or storage of food for man, or used as a factory, workshop, or workplace, nor shall he construct any earth-closet so that it can be entered otherwise than from the external air.

Water and earth closets.

He shall construct such water-closet so that on any side on which it would abut on a room intended for human habitation, or used for the manufacture, preparation, or storage of food for man, or used as a factory, workshop, or workplace, it shall be enclosed by a solid wall or partition of brick or other materials, extending the entire height from the floor to the ceiling.

Water-closets.

He shall provide any such water-closet that is approached from the external air with a floor of hard smooth impervious material, having a fall to the door of such water-closet of $\frac{1}{2}$ in. to the foot.

He shall provide such water-closet with proper doors and fastenings.

Provided always that this bye-law shall not apply to any water-closet constructed below the surface of the ground, and approached directly from an area or other open space available for purposes of ventilation, measuring at least 40 super. ft. in extent, and having a distance across of not less than 5 ft., and not covered in otherwise than by a grating or railing.

2. Every person who shall construct a water-closet in connection with a building, whether the situation of such water-closet be or be not within or partly within such building, and every person who shall construct an earth-closet in connection with a building, shall construct in one of the walls of such water-closet or earth-closet which shall abut upon the public way, yard, garden, or open space, as provided by the preceding bye-law, a window of such dimensions that an area of not less than 2 sq. ft., which may be the whole or part of such window, shall open directly into the external air.

He shall, in addition to such window, cause such water-closet or earth-closet to be provided with adequate means of constant ventilation by at least one air-brick built in an external wall of such water-closet or earth-closet, or by an air-shaft, or by some other effectual method or appliance.

3. Every person who shall construct a water-closet in connection with a building, shall furnish such water-closet with a cistern of adequate capacity for the purpose of flushing, which shall be separate and distinct from any cistern used for drinking purposes, and shall be so constructed, fitted, and placed as to admit of the supply of water for use in such water-closet, so that there shall not be any direct connection between any service pipe upon the premises and any part of the apparatus of such water-closet other than such flushing cistern.

Provided always that the foregoing requirement shall be deemed to be complied with in any case where the apparatus of a water-closet is connected for the purpose of flushing with

a cistern of adequate capacity, which is used solely for flushing water-closets or urinals.

He shall construct or fix the pipe and union connecting such flushing cistern with the pan, basin, or other receptacle with which such water-closet may be provided, so that such pipe and union shall not in any part have an internal diameter of less than $1\frac{1}{4}$ in.

He shall furnish such water-closet with a suitable apparatus for the effectual application of water to any pan, basin, or other receptacle with which such apparatus may be connected and used, and for the effectual flushing and cleansing of such pan, basin, or other receptacle, and for the prompt and effectual removal therefrom and from the trap connected therewith of any solid or liquid filth which may from time to time be deposited therein.

He shall furnish such water-closet with a pan, basin, or other suitable receptacle of non-absorbent material, and of such shape, of such capacity, and of such mode of construction as to receive and contain a sufficient quantity of water, and to allow all filth which may from time to time be deposited in such pan, basin, or receptacle, to fall free of the sides thereof and directly into the water received and contained in such pan, basin, or receptacle.

He shall not construct or fix under such pan, basin, or receptacle, any "container" or other similar fitting.

He shall construct or fix immediately beneath or in connection with such pan, basin, or other suitable receptacle, an efficient siphon trap, so constructed that it shall at all times maintain a sufficient water seal between such pan, basin, or other suitable receptacle and any drain or soil pipe in connection therewith. He shall not construct or fix in or in connection with the water-closet apparatus any D trap or other similar trap.

Note.—The last paragraph of bye-law 3, omitted here, and the whole of bye-law 4, have been repealed by a bye-law allowed by the Local Government Board on 14th June 1901, and which it is unnecessary to give in this place. The subject matter is respecting soil and anti-syphonage pipes.

5. A person who shall newly fit or fix any apparatus in connection with any existing water-closet, shall as regards such apparatus and its connection with any soil pipe or drain, comply with such of the requirements of the foregoing bye-laws as would be applicable to the apparatus so fitted or fixed if the water-closet were being newly constructed.

Earth-closets.

6. Every person who shall construct an earth-closet in connection with a building shall furnish such earth-closet with a reservoir or receptacle, of suitable construction and of adequate capacity, for dry earth, and he shall construct and fix such reservoir or receptacle in such a manner and in such a position as to admit of ready access to such reservoir or receptacle for the purpose of depositing therein the necessary supply of dry earth.

He shall construct or fix in connection with such reservoir or receptacle suitable means or apparatus for the frequent and effectual application of a sufficient quantity of dry earth to any filth which may from time to time be deposited in any receptacle for filth constructed, fitted, or used in, or in connection with, such earth-closet.

He shall construct such earth-closet so that the contents of such reservoir or receptacle may not at any time be exposed to any rainfall or to the drainage of any waste water or liquid refuse from any premises.

7. Every person who shall construct an earth-closet in connection with a building shall construct such earth-closet for use in combination with a movable receptacle for filth.

He shall construct such earth-closet so as to admit of a movable receptacle for filth, of a capacity not exceeding 2 cub. ft., being placed and fitted beneath the seat in such a manner and in such a position as may effectually prevent the deposit upon the floor or sides of the space beneath such seat, or elsewhere than in such receptacle, of any filth which may from time to time fall or be cast through the aperture in such seat.

He shall construct such receptacle for filth in such a manner and in such a position as to admit of the frequent and effectual

application of a sufficient quantity of dry earth to any filth which may be from time to time deposited in such receptacle for filth, and in such a manner and in such a position as to admit of ready access for the purpose of removing the contents thereof.

He shall also construct such earth-closet so that the contents of such receptacle for filth may not at any time be exposed to any rainfall or to the drainage of any waste water or liquid refuse from any premises.

8. Every person who shall construct a privy in connection with a building shall construct such privy at a distance of 20 ft. at the least from a dwelling-house, or public building, or any building in which any person may be or may be intended to be employed in any manufacture, trade, or business. Privies.

9. A person who shall construct a privy in connection with a building shall not construct such privy within the distance of 100 ft. from any well, spring, or stream of water used, or likely to be used, by man for drinking or domestic purposes, or for manufacturing drinks for the use of man, or otherwise in such a position as to render any such water liable to pollution.

10. Every person who shall construct a privy in connection with a building shall construct such privy in such a manner and in such a position as to afford ready means of access to such privy, for the purpose of cleansing such privy and of removing filth therefrom, and in such a manner and in such a position as to admit of all filth being removed from such privy, and from the premises to which such privy may belong, without being carried through any dwelling-house, or public building, or any building in which any person may be or may be intended to be employed in any manufacture, trade, or business.

11. Every person who shall construct a privy in connection with a building, shall provide such privy with a sufficient opening for ventilation as near to the top as practicable and communicating directly with the external air.

He shall cause the floor of such privy to be flagged or paved with hard tiles or other non-absorbent material, and he shall

construct such floor so that it shall be in every part thereof at a height of not less than 6 in. above the level of the surface of the ground adjoining such privy, and so that such floor shall have a fall or inclination towards the door of such privy of $\frac{1}{2}$ in. to the foot.

12. Every person who shall construct a privy in connection with a building shall construct such privy for use in combination with a movable receptacle for filth, and shall construct over the whole area of the space immediately beneath the seat of such privy a floor of flagging or asphalte or some suitable composite material, at a height of not less than 3 in. above the level of the surface of the ground adjoining such privy; and he shall cause the whole extent of each side of such space between the floor and the seat, other than any part that may be occupied by any door or other opening therein, to be constructed of flagging, slate, or good brickwork, at least 9 in. thick, and rendered in good cement or asphalted.

He shall construct the seat of such privy, the aperture in such seat, and the space beneath such seat, of such dimensions as to admit of a movable receptacle for filth of a capacity not exceeding 2 cub. ft. being placed and fitted beneath such seat in such a manner and in such a position as may effectually prevent the deposit upon the floor or sides of the space beneath such seat, or elsewhere than in such receptacle, of any filth which may from time to time fall or be cast through the aperture in such seat.

He shall construct such privy so that for the purpose of cleansing the space beneath the seat, or of removing therefrom or placing or fitting therein an appropriate receptacle for filth, there shall be a door or other opening in the back or one of the sides thereof capable of being opened from the outside of the privy, or in any case where such a mode of construction may be impracticable, so that for the purposes aforesaid the whole of the seat of the privy or a sufficient part thereof may be readily moved or adjusted.

13. A person who shall construct a privy in connection with

a building shall not cause or suffer any part of the space under the seat of such privy, or any part of any receptacle for filth in or in connection with such privy, to communicate with any drain.

14. Every person who shall intend to construct any water-closet, earth-closet, or privy, or to fit or fix in or in connection with any water-closet, earth-closet, or privy, any apparatus or any trap or soil pipe, shall, before executing any such works, give notice in writing to the clerk of the Sanitary Authority.

Water-closets,
earth-closets,
and privies.

15. Every owner of an earth-closet or privy existing at the date of the confirmation of these bye-laws shall, before the expiration of six months from and after such date of confirmation, cause the same to be reconstructed in such manner that its position, structure, and apparatus shall comply with such of the requirements of the foregoing bye-laws as are applicable to earth-closets or privies newly constructed.

Earth-closets
and privies.

16. When any person shall provide an ashpit in connection with a building, he shall cause the same to consist of one or more movable receptacles sufficient to contain the house refuse which may accumulate during any period not exceeding one week. Each of such receptacles shall be constructed of metal and shall be provided with one or more suitable handles and cover. The capacity of each of such receptacles shall not exceed 2 cub. ft.

Ashpits.

Provided that the requirement as to the size of each of such receptacles shall not apply to any person who shall construct such receptacle or receptacles in connection with any premises to which there is attached as part of the conditions of tenancy the right to dispose of house refuse in an ashpit used in common by the occupiers of several tenancies, but in no case shall such ashpit be of greater capacity than is required to enable it to contain the refuse which may accumulate during any period not exceeding one week.

17. The occupier of any premises who shall use any ashpit shall, if such ashpit consist of a movable receptacle, cause such receptacle to be kept in a covered place, or to be properly covered, so that it shall not be exposed to rainfall, and if such

ashpit consist of a fixed receptacle, he shall cause the same to be kept properly covered.

18. Where the Sanitary Authority have arranged for the daily removal of house refuse in their district, or in any part thereof, the owner of any premises in such district or part thereof shall provide an ashpit which shall consist of one or more movable receptacles, sufficient to contain the house refuse which may accumulate during any period not exceeding three days, which the Sanitary Authority may determine, and of which the Sanitary Authority shall give notice by public announcement in their district. Each of such receptacles shall be constructed of metal, and provided with one or more suitable handles and cover. The capacity of each of such receptacles shall not exceed 2 cub. ft.

Provided always that this bye-law shall not apply to the owner of any premises until the expiration of three months after the Sanitary Authority have publicly notified their intention to adopt a system of daily collection of house refuse in that part of their district which comprises such premises.

19. Where any receptacle shall have been provided as an ashpit for any premises in pursuance of any bye-law in that behalf, no person shall deposit the house refuse which may accumulate on such premises in any ashpit that does not comply with the requirements of these bye-laws.

20. Every person who shall construct a cesspool in connection with a building shall construct such cesspool at a distance of 100 ft. at the least from a dwelling-house, or public building, or any building in which any person may be, or may be intended to be, employed in any manufacture, trade, or business.

21. A person who shall construct a cesspool in connection with a building shall not construct such cesspool within the distance of 100 ft. from any well, spring, or stream of water.

22. Every person who shall construct a cesspool in connection with a building shall construct such cesspool in such a manner and in such a position as to afford ready means of access to such cesspool, for the purpose of cleansing such cesspool, and

of removing the contents thereof, and in such a manner and in such a position as to admit of the contents of such cesspool being removed therefrom, and from the premises to which such cesspool may belong, without being carried through any dwelling-house, or public building, or any building in which any person may be, or may be intended to be, employed in any manufacture, trade, or business.

He shall not in any case construct such cesspool so that it shall have, by drain or otherwise, any means of communication with any sewer or any overflow outlet.

23. Every person who shall construct a cesspool in connection with a building shall construct such cesspool of good brickwork bedded and grouted in cement, properly rendered inside with cement, and with a backing of at least 9 in. of well-puddled clay around and beneath such brickwork, and so that such cesspool shall be perfectly watertight.

He shall also cause such cesspool to be arched or otherwise properly covered over, and to be provided with adequate means of ventilation.

24. A person shall not use as a receptacle for dung any receptacle so constructed or placed that one of its sides shall be formed by the wall of any room used for human habitation, or under a dwelling-house, factory, workshop, or workplace, and he shall not use any receptacle in such a situation that it would be likely to cause a nuisance or become injurious or dangerous to health. Dung pits.

25. Every owner of any existing receptacle for dung shall, before the expiration of six months from the date of the confirmation of these bye-laws, and every person who shall construct a receptacle for dung shall cause such receptacle to be so constructed that its capacity shall not be greater than 2 cub. yds., and so that the bottom or floor thereof shall not, in any case, be lower than the surface of the ground adjoining such receptacle.

He shall so construct such receptacle that a sufficient part of one of its sides shall be readily removable for the purpose of facilitating cleansing.

He shall also cause such receptacle to be constructed in such a manner and of such materials, and to be maintained at all times in such a condition as to prevent any escape of the contents thereof, or any soakage therefrom, into the ground or into the wall of any building.

He shall cause such receptacle to be so constructed that no rain or water can enter therein, and so that it shall be freely ventilated into the external air.

Provided that a person who shall construct a receptacle for dung, the whole of the contents of which are removed not less frequently than every forty-eight hours, shall not be required to construct such receptacle so that its capacity shall not be greater than 2 cub. yds.

And provided that a person who shall construct a receptacle for dung, which shall contain only dung of horses, asses, or mules with stable litter, and the whole of the contents of which are removed not less frequently than every forty-eight hours, may, instead of all other requirements of this bye-law, construct a metal cage, and shall beneath such metal cage adequately pave the ground at a level not lower than the surrounding ground, and in such a manner and to such an extent as will prevent any soakage into the ground; and if such cage be placed near to or against any building, he shall adequately cement the wall of such building in such a manner and to such an extent as will prevent any soakage from the dung within or upon such receptacle into the wall of such building.

The landlord or owner of any lodging-house shall provide and maintain in connection with such house, water-closet, earth-closet, or privy, accommodation in the proportion of not less than one water-closet, earth-closet, or privy for every twelve persons.

For the purposes of this bye-law "a lodging-house" means a house or part of a house which is let in lodgings or occupied by members of more than one family. "Landlord" in relation to a house or part of a house which is let in lodgings, or occupied by members of more than one family, means the person (whatever may be the nature or extent of his interest) by whom or on

Water-closet,
earth-closet,
and privy
accommoda-
tion.

whose behalf such house or part of a house is let in lodgings or for occupation by members of more than one family, or who for the time being receives or is entitled to receive the profits arising from such letting. "Lodger" in relation to a house or part of a house which is let in lodgings or occupied by members of more than one family, means a person to whom any room or rooms in such house or part of a house may have been let as a lodging or for his use or occupation.

Nothing in this bye-law shall extend to any common lodging-house.

APPENDIX F.

EXTRACTS FROM THE FACTORY AND WORKSHOP ACT, 1901
(1 ED. VII., CAP. 22).

SEC. 3.—(1.) A factory shall (for the purposes of this Act) and a workshop shall (for the purposes of the law relating to public health) be deemed to be so overcrowded as to be dangerous or injurious to the health of the persons employed therein, if the number of cubic feet of space in any room therein bears to the number of persons employed at one time in the room a proportion less than 250 (or during any period of overtime, 400) cub. ft. of space to every person.

(2.) Provided that the Secretary of State may, by special Order, modify this proportion for any period during which artificial light other than electric light is employed for illuminating purposes, and may, by like Order, as regards any particular manufacturing process or handicraft, substitute for the said figures of 250 and 400 respectively any higher figures, and thereupon this section shall have effect as modified by the Order.

(3.) Where a workshop or workplace, not being a *domestic** workshop, is occupied by day as a workshop and by night as a sleeping apartment, the Secretary of State may by special Order modify the proportion of cubic feet of space prescribed by this section, and substitute therefor any higher figures, and thereupon this section shall have effect as modified by the Order.

SEC. 8.—(1.) In every factory or workshop or part thereof in which any process is carried on which renders the floor liable to

* For definition of "Domestic Workshop" see Sec. 115, page 205.

be wet to such an extent that the wet is capable of being removed by drainage, adequate means shall be provided for draining off the wet.

(*N.B.*—This does not apply to men's workshops, that is to say, workshops conducted on the system of not employing any woman, young person, or child.)

SEC. 9.—(1.) Every factory and workshop must be provided with sufficient and suitable accommodation in the way of sanitary conveniences, regard being had to the number of persons employed in or in attendance at the factory or workshop, and also where persons of both sexes are or are intended to be employed or in attendance, with proper separate accommodation for persons of each sex.

(2.) The Secretary of State shall, by special Order, determine what is sufficient and suitable accommodation within the meaning of this section.

(3.) A factory or workshop in which there is a contravention of this section shall be deemed not to be kept in conformity with this Act.

(4.) This *section* does not apply to the administrative county of London, or to any place where section 22 of the Public Health Acts Amendment Act, 1890, is in force.

SEC. 15. Every District Council shall, in addition to any powers which they possess with reference to the prevention of fire, have power to make Bye-laws providing for means of escape from fire in the case of any factory or workshop, and sections 182 to 186 of Public Health Act (1875) shall apply to any bye-laws so made.

SEC. 16.

(2.) In every factory or workshop the construction of which was not commenced before the first day of January 1896, the doors of each room in which more persons than ten are employed, shall, except in the case of sliding doors, be constructed so as to open outwards.

* SEC. 74. If in a factory or workshop where grinding, glazing, or polishing on a wheel, or any process is carried on by which dust or any gas, vapour, or other impurity is generated and inhaled by the workers to an injurious extent, it appears to an inspector that such inhalation could be to a great extent prevented by the use of a fan or other mechanical means, the inspector may direct that a fan or other mechanical means of a proper construction for preventing such inhalation be provided within a reasonable time, and if the same is not provided, maintained, and used, the factory or workshop shall be deemed not to be kept in conformity with this Act.

* SEC. 75.—(1.) In every factory or workshop where lead, arsenic, or any other poisonous substance is used, suitable washing conveniences must be provided for the use of the persons employed in any department where such substances are used.

(2.) In every factory or workshop where lead, arsenic, or any other poisonous substance is so used as to give rise to dust or fumes, a person shall not be allowed to take a meal, or to remain during the times allowed to him for meals, in any room in which any such substance is used, and suitable provision shall be made for enabling the persons employed in such rooms to take their meals elsewhere in the factory or workshop.

SEC. 78.—(1.) A woman, young person, or child† must not be allowed to take a meal or to remain during the times allowed for meals in the following factories or workshops, or parts of factories or workshops; that is to say—

(a.) In the case of glass-works, in any part in which the materials are mixed; and

(b.) In the case of glass-works where flint glass is made, in any part in which the work of grinding, cutting, or polishing is carried on; and

* Sections 74 and 75 do not apply to men's workshops, that is to say, workshops conducted on the system of not employing any woman, young person, or child.

† For definition of these terms see Sect. 156, page 209.

(c.) In the case of lucifer-match works, in any part in which any manufacturing process or handicraft (except that of cutting the wood) is usually carried on ; and

(d.) In the case of earthenware works, in any part known or used as dipper's house, dipper's drying-room, or china scouring-room.

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(4.) Where it appears to the Secretary of State that by reason of the nature of the process in any class of factories or workshops, or parts thereof not named in this section, the taking of meals therein is specially injurious to health, he may, if he thinks fit, by special Order, extend the prohibition in this section to the class of factories or workshops or parts thereof.

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SEC. 94.—(5.) In every cotton cloth factory erected after the second day of February 1898, a sufficient and suitable cloak-room, or cloak-rooms shall be provided for the use of all the persons employed therein, and shall be ventilated and kept at a suitable temperature.

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SEC. 97.—(1.) It shall not be lawful to let or suffer to be occupied or to occupy any room or place as a bakehouse, unless the following regulations are complied with :—

(a.) A water-closet, earth-closet, privy, or ashpit must not be within, or communicate directly with the bakehouse ;

(b.) Every cistern for supplying water to the bakehouse must be separate and distinct from any cistern for supplying water to a water-closet ;

(c.) A drain or pipe for carrying off fæcal or sewage matter must not have an opening within the bakehouse.

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SEC. 100.—(1.) A place on the same level with a bakehouse, and forming part of the same building, may not be used as a sleeping place, unless it is constructed as follows ; that is to say—

(a.) Is effectually separated from the bakehouse by a partition extending from the floor to the ceiling ; and

(b.) Has an external glazed window of at least 9 super. ft. in area, of which at the least $4\frac{1}{2}$ super. ft. are made to open for ventilation.

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SEC. 101.—(1.) An underground bakehouse shall not be used as a bakehouse unless it was so used at the passing of this Act.

(2.) Subject to the foregoing provision, after the first day of January 1904 an underground bakehouse shall not be used unless certified by the District Council to be suitable for that purpose.

(3.) For the purpose of this section an underground bakehouse shall mean a bakehouse, any baking-room of which is so situate that the surface of the floor is more than 3 ft. below the surface of the footway of the adjoining street, or of the ground adjoining or nearest to the room. The expression “baking-room” means any room used for baking, or for any process incidental thereto.

(4.) An underground bakehouse shall not be certified as suitable unless the District Council is satisfied that it is suitable as regards construction, light, ventilation, and in all other respects.

(5.) This section shall have effect as if it were included among the provisions relating to bakehouses which are referred to in section 26 of the Public Health (London) Act, 1891.

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SEC. 103.—(3.) In the case of every laundry worked by steam, water, or other mechanical power :—

(a.) A fan or other means of a proper construction must be provided, maintained, and used for regulating the temperature in every ironing-room, and for carrying away the steam in every washhouse in the laundry ; and

(b.) All stoves for heating irons must be sufficiently separated from any ironing-room, and gas irons emitting any noxious fumes must not be used ; and

(c.) The floors must be kept in good condition and drained in such manner as will allow the water to flow off freely.

A laundry in which these provisions are contravened shall be deemed to be a factory not kept in conformity with this Act.

(4.) Nothing in this section shall apply to any laundry in which the only persons employed are :—

(a.) Inmates of any prison, reformatory, or industrial school, or other institution for the time being subject to inspection under any Act other than this Act ; or

(b.) Inmates of an institution conducted in good faith for religious or charitable purposes ; or

(c.) Members of the same family dwelling there, or in which not more than two persons dwelling elsewhere, are employed.

SEC. 114.—(1.) The exercise in a private house or private room by the family dwelling therein, or by any of them, of manual labour by way of trade or for purposes of gain in or incidental to any of the following handicrafts, namely :—

(i.) Straw plaiting, or (ii.) pillow-lace making, or (iii.) glove making, shall not of itself constitute the house or room a workshop within the meaning of this Act.

SEC. 115. The expressions “domestic factory” and “domestic workshop” mean a private house, room, or place which, though used as a dwelling, is, by reason of the work carried on there, a factory or a workshop, as the case may be, within the meaning of this Act, and in which neither steam, water, nor other mechanical power is used in aid of the manufacturing process carried on there, and in which the only persons employed are members of the same family dwelling there.

SEC. 149.—(1.) Subject to the provisions of this section, the following expressions have in this Act the meanings hereby assigned to them ; that is to say—

The expression “textile factory” means any premises wherein or within the close or curtilage of which, steam, water, or other mechanical power is used to move or work any machinery employed in preparing, manufacturing, or finishing, or in any

process incident to the manufacture of cotton, wool, hair, silk, flax, hemp, jute, tow, china-grass, cocoanut fibre, or other like material, either separately or mixed together, or mixed with any other material or any fabric made thereof :

Provided that print works, bleaching and dyeing works, lace warehouses, paper mills, flax scutch mills, rope works, and hat works shall not be deemed to be textile factories.

The expression "non-textile factory" means—

(a.) Any works, warehouses, furnaces, mills, foundries, or places named in Part One of Schedule VI. to this Act ; and

(b.) Any premises or places named in Part Two of the said Schedule wherein or within the close or curtilage or precincts of which, steam, water, or other mechanical power is used in aid of the manufacturing process carried on there ; and

(c.) Any premises wherein or within the close or curtilage or precincts of which any manual labour is exercised by way of trade or for purposes of gain in or incidental to any of the following purposes, namely—

(i.) The making of any article or of part of any article ; or

(ii.) The altering, repairing, ornamenting, or finishing of any article ; or

(iii.) The adapting for sale of any article, and wherein or within the close or curtilage or precincts of which, steam, water, or other mechanical power is used in aid of the manufacturing process carried on there.

The expression "factory" means textile factory and non-textile factory, or either of those descriptions of factories.

The expression "tenement factory" means a factory where mechanical power is supplied to different parts of the same building occupied by different persons for the purpose of any manufacturing process or handicraft, in such manner that those parts constitute in law separate factories, and for the purpose of the provisions of this Act with respect to tenement factories all buildings situate within the same close or curtilage shall be treated as one building.

The expression "workshop" means—

(a.) Any premises or places named in Part Two of Schedule VI. to this Act, which are not a factory ; and

(b.) Any premises, room, or place, not being a factory, in which premises, room, or place, or within the close or curtilage or precincts of which premises any manual labour is exercised by way of trade or for purposes of gain in or incidental to any of the following purposes, namely—

(i.) The making of any article or of part of any article ; or

(ii.) The altering, repairing, ornamenting, or finishing of any article ; or

(iii.) The adapting for sale of any article, and to or over which premises, room, or place the employer of the persons working therein has the right of access or control.

The expression "workshop" includes a tenement workshop.

The expression "tenement workshop" means any workplace in which, with the permission of or under agreement with the owner or occupier, two or more persons carry on any work which would constitute the workplace a workshop if the persons working therein were in the employment of the owner or occupier.

(2.) A part of a factory or workshop may, with the approval in writing of the chief inspector, be taken for the purposes of this Act to be a separate factory or workshop.

(3.) A room solely used for the purpose of sleeping therein shall not be deemed to form part of the factory or workshop for the purposes of this Act.

(4.) Where a place situate within the close, curtilage, or precincts forming a factory or workshop is solely used for some purpose other than the manufacturing process or handicraft carried on in the factory or workshop, that place shall not be deemed to form part of the factory or workshop for the purposes of this Act, but shall, if otherwise it would be a factory or workshop, be deemed to be a separate factory or workshop, and be regulated accordingly.

(5.) A place or premises shall not be excluded from the

definition of a factory or workshop by reason only that the place or premises is or are in the open air.

(6.) The exercise by any young person or child in any recognised efficient school, during a portion of the school hours, of any manual labour for the purpose of instructing the young person or child in any art or handicraft, shall not be deemed to be an exercise of manual labour for the purpose of gain within the meaning of this Act.

SEC. 153.—(1.) In the application to the administrative county of London of the section of this Act relating to the means of escape from fire, the London County Council shall take the place of the District Council, and their expenses in the execution of that section shall be defrayed as part of their expenses in the management of the London Building Act, 1894.

(2.) In the application to the administrative county of London of the section of this Act giving power to make Bye-laws providing for means of escape from fire, the reference to a District Council shall be construed as a reference to the London County Council.

(3.) The power of the London County Council under section 164 of the London Building Act, 1894, to make Bye-laws with respect to the means of escape from fire in buildings exceeding 60 ft. in height, shall extend to all factories and workshops whether exceeding 60 ft. in height or not.

(4.) Subject as aforesaid, references in this Act to a District Council and the district thereof shall, as regards the city of London, be construed as references to the Court of Common Council and the City, and as regards any other part of the administrative county of London, as references to the Council of a metropolitan borough and the metropolitan borough.

SEC. 154.—References in this Act to a District Council and the district thereof shall be construed as including references to the Council of a County borough and the County borough.

SEC. 155.—The powers conferred by this Act on district councils shall be in addition to, and not in substitution for any other powers which they may possess.

SEC. 156.—(1.) In this Act, unless the context otherwise requires—

The expression “child” means a person who is under the age of fourteen years, and who has not, being of the age of thirteen years, obtained the certificate of proficiency or attendance at school mentioned in Part III. of this Act.

The expression “owner” has the meaning given to it by section 4 of the Public Health Act, 1875.

The expression “process” includes the use of any locomotive.

The expression “woman” means a woman of the age of eighteen years and upwards.

The expression “young person” means a person who has ceased to be a child and is under the age of eighteen years.

SEC. 158.—Nothing in this Act shall extend to any young person, being a mechanic, artizan, or labourer, working only in repairing either the machinery in or any part of a factory or workshop.

Regulations as to grinding in tenement factory—

(1.) Boards to fence the shafting and pulleys, locally known as drum boards, must be provided and kept in proper repair.

(2.) Handrails must be fixed over the drums and kept in proper repair.

(3.) Belt guards, locally known as scotchmen, must be provided and kept in proper repair.

(4.) Every floor constructed on or after the first day of January 1896 must be so constructed and maintained as to facilitate the removal of slush, and all necessary shoots, pits, and other conveniences must be provided for facilitating such removal.

(5.) Every grinding room or hull established on or after the first day of January 1896 must be so constructed that for the

Third
Schedule.

purpose of light grinding there shall be a clear space of 3 ft. at least between each pair of troughs, and for the purpose of heavy grinding there shall be a clear space of 4 ft. at least between each pair of troughs, and 6 ft. at least in front of each trough.

(6.) The sides of all drums in every grinding room or hull must be closely fenced.

(7.) Except in pursuance of a special exemption granted by the Secretary of State, a grindstone must not be run before any fireplace or in front of another grindstone.

(8.) A grindstone erected on or after the first day of January 1896 must not be run before any door or other entrance.

Sixth
Schedule.

Note by the Author.—This Schedule to the Factory and Workshop (1901) Act gives lists of factories and workshops with extended definitions; the lists are given below, the definitions being omitted.

Non-textile *factories* comprise—

Part I.

Blast furnaces, bleaching and dyeing works, book-binding works, cartridge works, copper mills, earthenware works, electrical stations, flax scutch mills, foundries, fustian-cutting works, glass works, indiarubber works, iron mills, letterpress printing works, lucifer-match works, metal works, paper mills, paper-staining works, percussion-cap works, print works, tobacco factories.

Non-textile *factories and workshops* comprise—

Part II.

Bakehouses, bottle-washing works, carpet-beating works, dry-cleaning works, hat works, lace warehouses, pit banks, quarries, rope works, shipbuilding yards.



ERRATA.

In the Index the following small errors have occurred :—

Boilers.	Insert reference to page	127.
Cow-House.	Delete „ „	129.
Cloak and Hat Pegs	<i>for</i> page 127 <i>read</i>	128.
Kitchen Range	„ 132 „	130.
Loose Boxes	„ 133 „	131.
Mangle	„ 130 „	132.
Market. Cart Avenue	„ 131 „	132.
„ Stalls and Shops	„ 131 „	132.
Stables	„ 133 „	134.
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NOTES.—An asterisk—thus *12—before a page number indicates two or more references on such page to the subject. Index references are not made either to the lists (a) and (b) in Chapter III., nor are asterisk references made to words repeated in sequence. Where a heading or marginal note covers a repetition of the same words, it is indexed as one reference.

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